ENGINEERING
NEWS-RECORD

The Nation's Top Contractors—

WHO led the list at the start of '57?

WHAT volume of business did '57 bring?

HOW do they rank today?

An ENR Staff Report – page 21

A McGRAW-HILL PUBLICATION

E B POWER
UNIVERSITY MICROFILMS INC
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ANN ARBOR MICH
GS N

OASIS...
on the KANSAS TURNPIKE

Six 40,000-gal. Horton Waterspheres welcome turnpike travelers to food and motor supplies along the 236 mile route at: Topeka, Emporia, Lawrence, El Dorado, Matfield Green, and Wellington, Kansas.

SIX HORTON WATERSPHERES
Landmark $160 Million Toll Road Project

Opening a new modern route to the Southwest, the Kansas Turnpike passes through 236 miles of the most densely . . . and the most sparsely, populated sections of Kansas.

Six Horton Waterspheres® beckon pike travelers, from a distance, to service areas spaced at 45 mile intervals along the route. Their pleasing symmetry typifies the careful blending of beauty, safety and utility which has marked the commission's planning for this project.

Waterspheres are all-welded structures which require little maintenance and a minimum of ground area for foundations. The base may be utilized for pumping equipment or storage. Built in capacities to 250,000 gallons, Waterspheres provide dependable gravity pressure water storage for general service. Write your nearest CB&I office for details.

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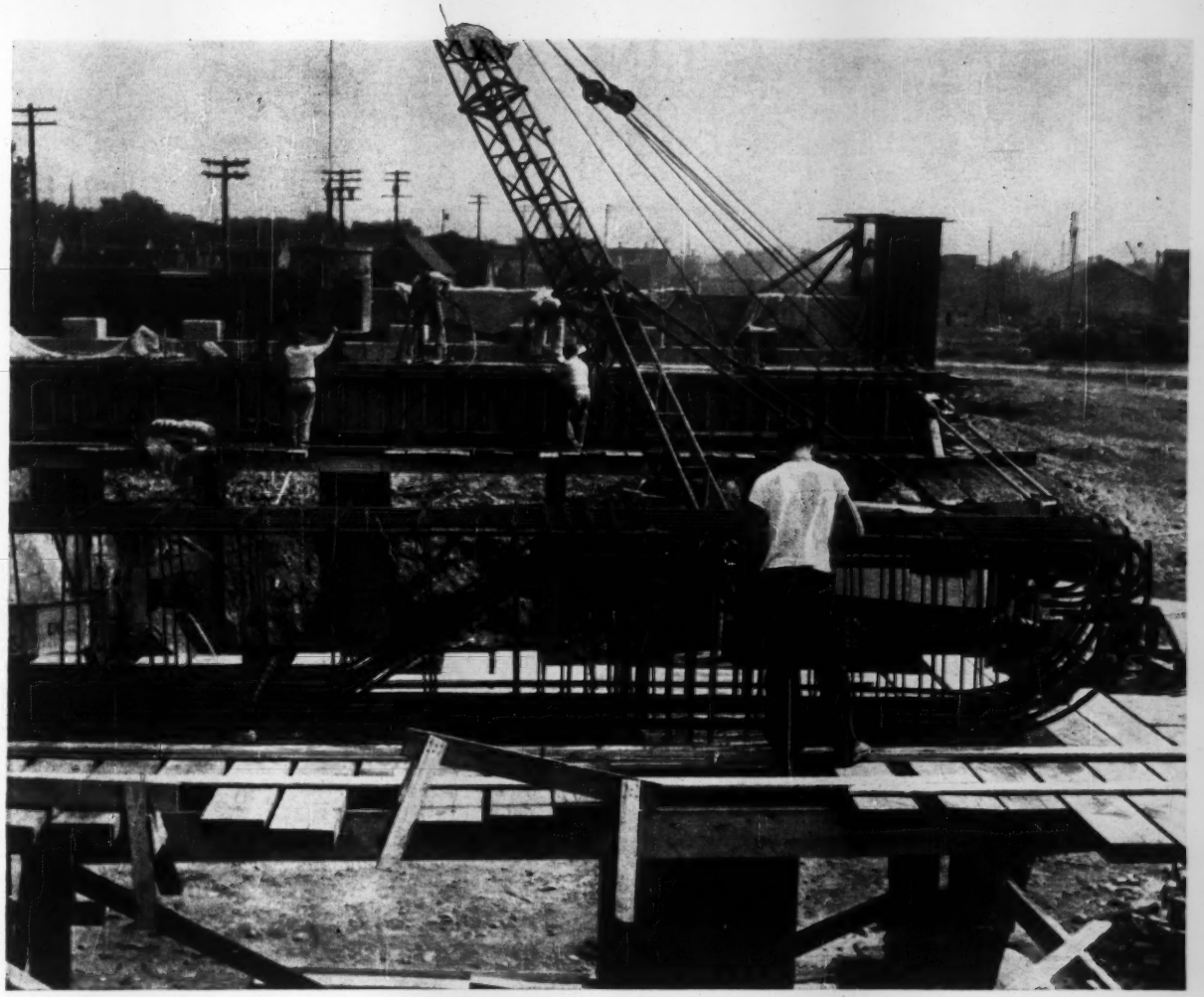

Horizontal assembly of Bethlehem reinforcing bars is made ready for capping a pier for an overpass along New York Thruway. Contractor: H. F. Stimm, Inc., Buffalo, N. Y.

Fabricated Reinforcing Bars Help Speed Construction of New York Thruway

It was full speed ahead for the Niagara section of the New York Thruway throughout the past summer. This portion of the superhighway, along the scenic Niagara River, will connect Buffalo with the city of Niagara Falls, N. Y.

In the Black Rock area of Buffalo, Bethlehem steel reinforcing bars were used in various abutments, retaining walls and overpasses. Shown above is a horizontal bar assembly being made ready to cap a pier. The bars reached the job site fully fabricated, bundled and tagged, ready for immediate placement with no delays to operation schedules.

Bethlehem is well equipped to furnish fabricated reinforcing bars to any part of the country for any size job. Bethlehem bars are made from new-billet steel to ASTM Specifications A-15 and A-305 in the conventional sizes. Facilities for shearing, bending and bundling bars are located throughout the country at ten Bethlehem bar fabricating shops.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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BETHLEHEM STEEL

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EIGHTY-FOURTH YEAR OF PUBLICATION

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LONG SERVICE — The service life of acid-resistant UNIVERSAL Vitrified Clay Pipe is unlimited. When joined with equally durable TYLOX Flexible couplings, the line is *permanently* resistant to sewerage and industrial waste acids and alkalies. Write today and arrange for UNIVERSAL TYLOX-Coupled Vitrified Clay Pipe on *your* next project. Assure long lasting, compression-tight sewers and drains installed at lower cost.

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IMPORTANT NEWS!

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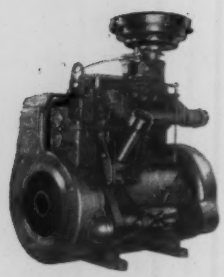
TO ENGINE USERS EVERYWHERE----

THE FAMOUS LYCOMING AIR-COOLED INDUSTRIAL ENGINE LINE, TWO AND FOUR CYLINDERS, WILL NOW BE MADE BY HERCULES MOTORS CORPORATION. THIS FORWARD STEP ENABLES HERCULES TO OFFER A PROVED, DEPENDABLE AIR-COOLED ENGINE IN ADDITION TO ITS WATER-COOLED ENGINES, GIVING USERS A WIDE SELECTION OF VALVE-IN-HEAD ENGINES IN THE DISPLACEMENT RANGE FROM 88 TO 339 CU. IN.

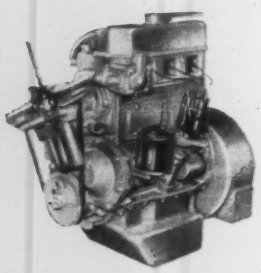
THE HERCULES REPUTATION FOR RELIABILITY, QUALITY MANUFACTURING AND ENGINEERING, PLUS THE COMBINED DISTRIBUTOR ORGANIZATIONS FOR BOTH LYCOMING AND HERCULES, ASSURE PRESENT CUSTOMERS AND POTENTIAL USERS MUCH BROADER SPREAD OF IMPROVED SERVICE FACILITIES.

FULL SCALE PRODUCTION OF THE LYCOMING AIR-COOLED ENGINE AT HERCULES CANTON OHIO PLANT SCHEDULED FOR EARLY 1958. YOUR INQUIRIES WILL BE APPRECIATED AND WILL BE PROMPTLY AND COURTEOUSLY ANSWERED.

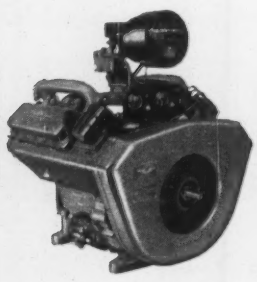
W.L. PRINGLE, PRESIDENT
HERCULES MOTORS CORPORATION
CANTON 2, OHIO



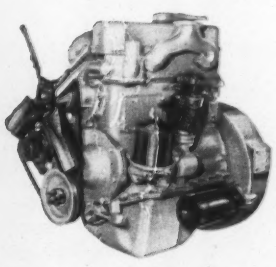
Lycoming-Design Hercules Two Cylinder Air-Cooled Industrial Gasoline Engine, Displacement 88 cu. in.



Hercules Three Cylinder Water-Cooled Gasoline (or Diesel) Engine, Displacement 130-149-169 cu. in.



Lycoming-Design Hercules Four Cylinder Air-Cooled Industrial Gasoline Engine, Displacement 176 cu. in.



Hercules Four Cylinder Water-Cooled Diesel (or Gasoline) Engine, Displacement 173-198-226 cu. in.

Hercules engines are also available in six cylinder 260, 298 and 339 cu. in. valve-in-head water-cooled types.

Road contractor's 6-Payhauler® fleet *outhauls competitive rigs...up to 2-to-1!*

"When we pulled a '65' Payhauler unit off the stockpile for another job, two of our other off-highway trucks were needed to replace it," reports Supt. Virgil Rice, for Cage Brothers, San Antonio, Texas. This Payhauler trio is running circles around other outfits, on a 12-mile road-rebuilding project near Snyder, Texas!

Prove the get-away surge, and up to 25% faster haul speed of an International Payhauler—the result of bonus turbo-charged diesel power; road-matched and load-matched gear choice; and the power-cushioning leverage of planetary drive axles.

Try Payhauler "pick-up truck" spotting ease. Exclusive high reverse, "zip-around" power steering, and grade-beating power get the credit! See how 12-second dumping with double-acting hydraulic hoist speeds the cycle. Measure the effect of Payhauler operating ease, and downgrade safety, for example, of positive Torq-matic braking! See your International Construction Equipment Distributor for a demonstration!

"I'm just sorry all our haulers aren't International Payhauler units," adds Supt. E. R. Rice. "They haul bigger loads, faster; give less trouble; and operators like them better than our other new haul units." This Mr. Rice rides herd on another Cage Brothers' 3-unit Payhauler team—setting a fast tonnage pace, hauling limestone for highway resurfacing, near Abilene.

International® Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors ... Self-Propelled Scrapers ... Crawler and Rubber-Tired Loaders ... Off-Highway Haulers ... Diesel and Carbureted Engines ... Motor Trucks ... Farm Tractors and Equipment.

International Harvester Co.
180 N. Michigan, Chicago 1, Ill.

Gentlemen:

☐ I am a contractor. ☐ Am interested in becoming a contractor. ☐ Am an equipment operator (please check square that applies). Send me Payhauler Catalog (CR-603-G).

Name_____

Street Address_____

City_____ State_____

Here are seven of the 8-unit Ray Wallace Construction Company TD-24 fleet—rolling earth on the big benching job. This big-capacity fleet moved up to 25,000 cu yd of earth and shale rock daily.

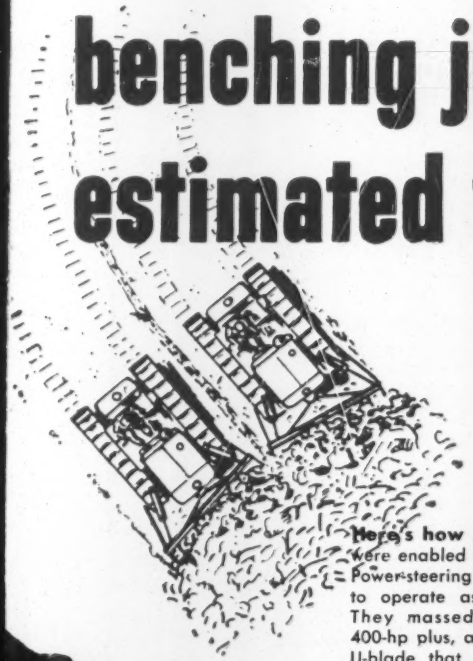
Two Wallace-owned TD-24's form a "twin-dozer"—push up to 40% more cu yd at a pass than the same units operating singly! Planet Power steering permits *precision teaming* of two TD-24's to carry maximum loads, even on the turns. And instant, on-the-go, planetary, Hi-Lo shifting speeds reversing for the next pass cuts cycle time!

Planet power-steered barrel through hill in half the

Three Ray Wallace Construction Company TD-24's — at work on "bench No. 6." Loosening of the tough material was done much faster and cheaper with a big ripper pulled by a TD-24 — instead of using dynamite!

"When I get bigger and tougher jobs, I just get more International TD-24's," states contractor Ray Wallace. "In a tight road-building schedule, our first TD-24 cleared its purchase price in only 28 days; was first overhauled at 8,700 hours. None of our equipment has lost time here, and we've cut the engineer's estimate in half! You can't get better performance than this."

TD-24's benching job estimated time



Here's how pairs of TD-24's were enabled by exclusive Planet Power-steering and Hi-Lo shifting to operate as *precision teams.* They massed their combined 400-hp plus, and formed a huge U-blade that moved a gigantic yardage per push. The extra yardage equalled a "dirt-dividend" of up to 40%—compared to two dozers, operating singly!

How International power exclusives give you a new basis for getting and fulfilling profitable contracts!

A series of seven huge benches had to be carved around this 350-foot-high hill—to rid California Rt. 1 of a dangerous slide area, near Rockdale.

Each self-draining bench is 50′ high, and 20′ wide on top. 800,000 cu yd (25% earth, 75% shale rock) had to be moved, primarily in curved "passes."

Ray L. Wallace Construction Co., Westport, California, won the contract by basing his bid on Planet Power-steered TD-24 performance and its proven ability to move and "hold" bonus yardage loads on turns as well as straight-aways! And his eight TD-24's did the job in only half the time the engineer estimated!

The difference: BIG TD-24 power exclusives

TD-24 power exclusives can often help you "run power circles" around conventionally steered, and geared king-sized crawlers!

Proven Planet Power steering, for example, eliminates "dead track drag" on the turns—gives full-time "live" power on both tracks while turning—enables the TD-24 to pull or push as big a load on the turns as on the straight-aways. Extra yards per pass mean bigger bonus yardage per day!

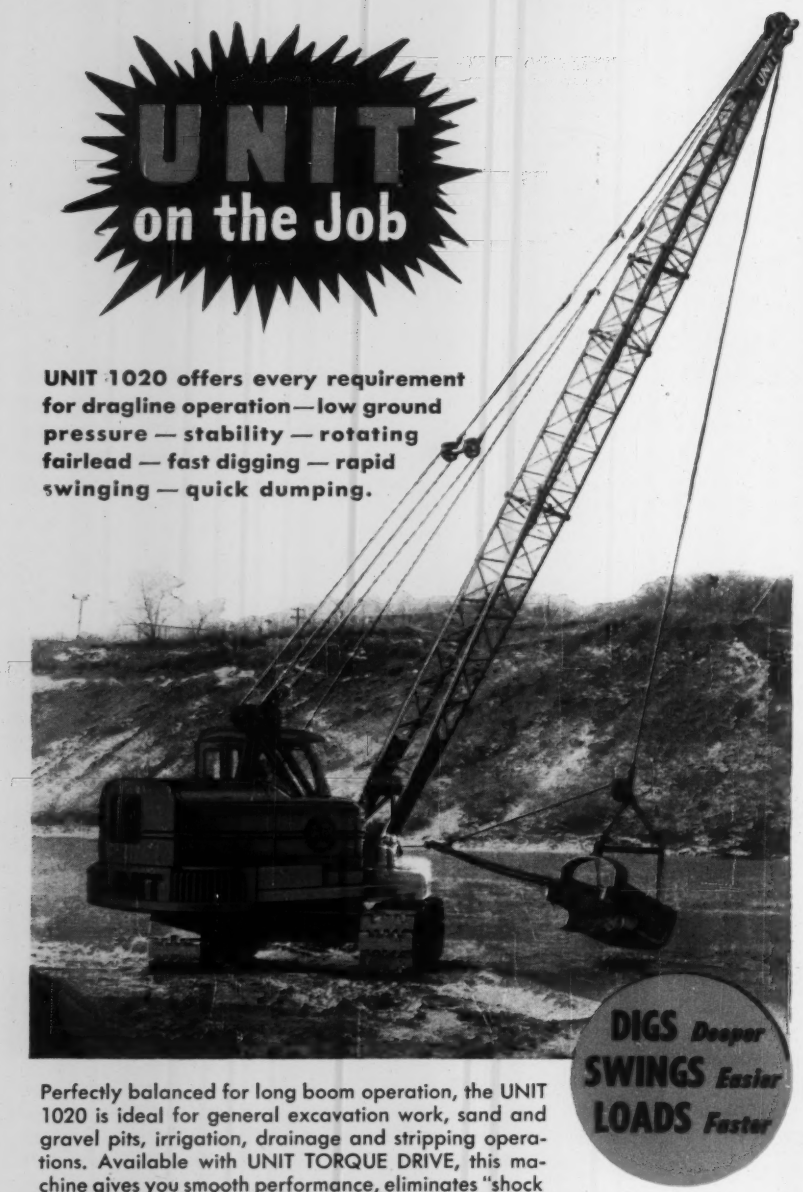
Cycle-speeding, TD-24 Hi-Lo shifting permits instant, on-the-go speed-changing—to faster or slower, either in forward or reverse. Instant speed adjustment to the load without stopping takes full-time advantage of full power! And planetary Hi-Lo shifting speeds up TD-24 shuttle-dozing cycle time—increases the number of passes per hour; thus increases TD-24 capacity!

See for yourself how these and other International TD-24 power exclusives arm you with a new, job-getting, profit-building basis for getting and fulfilling contracts. Ask your International Construction Equipment Distributor for a TD-24 demonstration!

International® Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.


UNIT on the Job
UNIT 1020 offers every requirement for dragline operation—low ground pressure — stability — rotating fairlead — fast digging — rapid swinging — quick dumping.
DIGS Deeper
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Perfectly balanced for long boom operation, the UNIT 1020 is ideal for general excavation work, sand and gravel pits, irrigation, drainage and stripping operations. Available with UNIT TORQUE DRIVE, this machine gives you smooth performance, eliminates "shock loads", cuts fuel expense. Write for literature.
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Reader Comment

Designer Replies

SIR—A. A. Kalinske, in last week's Reader Comment, questioned whether the use of calcite as a coagulation aid or the float controlled rate of flow controllers installed in the Oneonta, N. Y. waterworks are innovations ("Small Waterworks Features Six Major Innovations," ENR Oct. 31, 1957, p. 32). What he apparently overlooks is that the alum-calcite process is new and novel in that it provides for premixing of alum and finely ground crystalline limestone, and a detention period of the solution-suspension to permit this reaction to proceed only to a limited and controlled degree. There is no real comparison between this process (which is being patented) and the simple application of calcit to raw water as was practiced by the Army at Fort Belvoir, as employed earlier by me at the Ossining, N. Y., waterworks, or as employed by others more than 30 years ago.

Infilco's technical bulletin indicates that the calcite was applied to raw water separately. When applied in this manner, the reaction is hindered due to very dilute solution.

I have seen a number of installations where float operated butterfly valves were employed for controlling filter output, but they were not used in the manner in which they are employed at Oneonta. Our arrangement of a counterweighted float in the filter, cable-connected to a counterweighted butterfly valve in the filter effluent line, necessitates that water be introduced (to the filter) over some type of overflod weir, set above the maximum water level. This arrangement is not conventional and results in filter output exactly equalling filter influent, regardless of rate of flow.

THOMAS M. RIDDICK
Consulting Engineer and Chemist
New York, N. Y.

Slocum Reports on Bhakra

SIR—Two years ago, concrete placing was started for actual construction of Bhakra Dam, here in Nangal Township, Punjab, India. At that time there was

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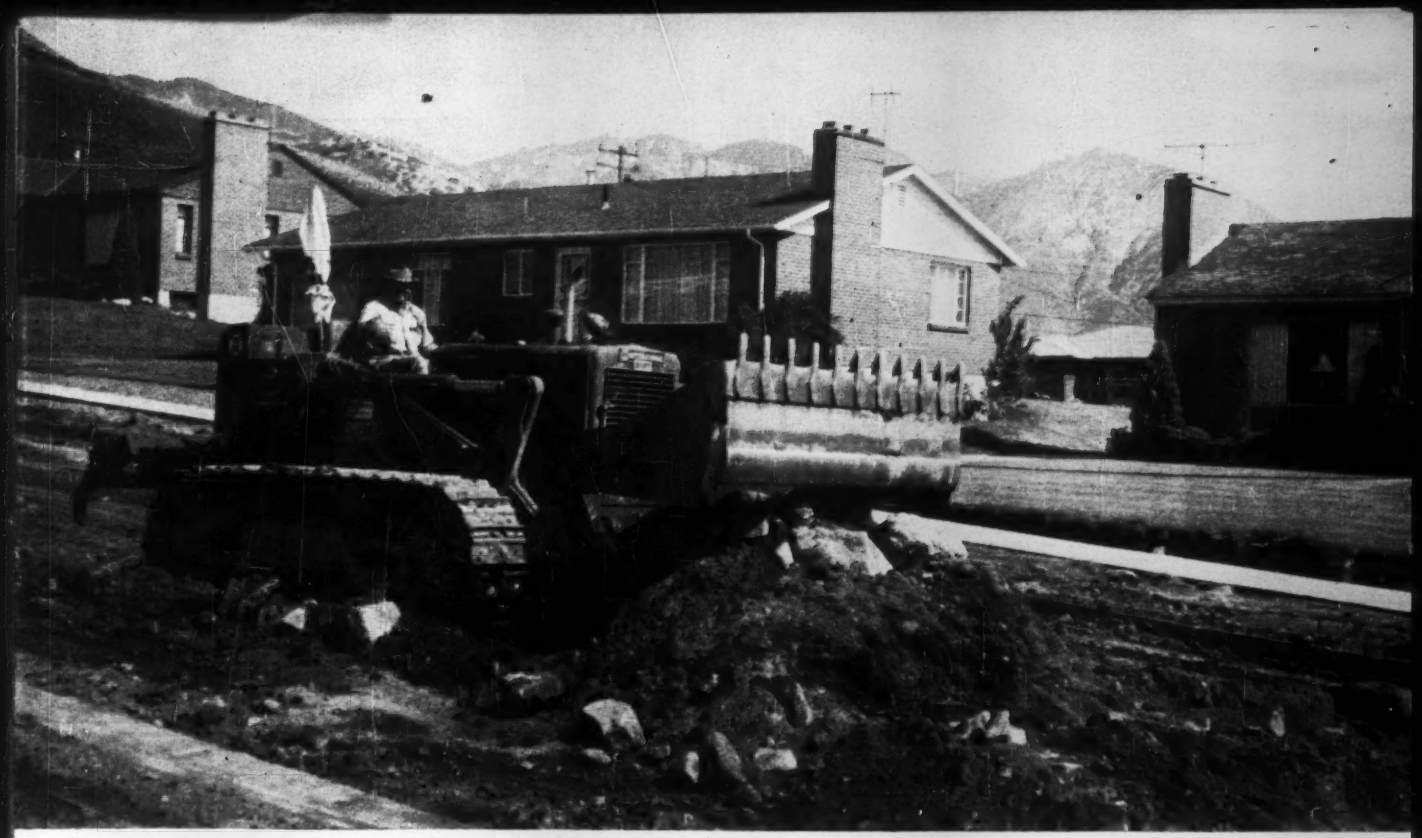

Another road-builder proves:

...4-in-1 four-machine utility can replace a flock of other equipment!

On a $270,000 street improvement project, Salt Lake City contractor, R. C. Bradshaw Construction Co. has proved you can replace several other machines—with *one* International Drott 4-In-1!

One minute, their TD-14 4-In-1 is a boulder-bucking, earth-rolling, tree-grubbing bulldozer. Next instant, it's a 2¼-cu yd Skid-Shovel, out-digging a back-hoe—and out-loading 'em all!

Move the machine-selector lever again—and the 4-In-1 is a "carry-type scraper" that does finish grading with inch-close accuracy. And fingertip easy, you get 4-In-1 clamshell action for fast clean-up, bank-shaping, ditch-digging, or stock-pile loading!

Or at a hydraulic command, the 4-In-1's scarifier attachment can be ripping asphalt or hard soil.

Exclusive pry-action break-out puts the 4-In-1 on tough jobs where less powerful diggers don't belong. Exclusive ground-level roll-back and exclusive parallelogram raise action make another "heap of difference" in favor of 4-In-1! And shock-swallowing Hydro-Spring gives the 4-In-1 performance protection no other make has!

Why buy-up and tie-up a flock of limited-duty equipment that one 4-In-1 can profitably replace? Yes, and with one perked-up operator giving you versatility unlimited! Send for a 4-In-1 catalog—see your International Drott Distributor for a 4-In-1 demonstration!

Send for free catalog today

Gentlemen: I am interested in facts on the 4-In-1 for use in:

☐ Road-building ☐ Producing aggregates
☐ Soil conservation ☐ Home and industrial construction

Please send 4-In-1 catalog literature checked:

☐ 1-yd TD-6 (CR-640 H) ☐ 1½-yd TD-9 (CR-627-H) ☐ 2¼-yd TD-14 (CR-635-H) ☐ 3-yd TD-18 (CR-632-H)

Name_____

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a small area available in the downstream spillway section and one cantilever crane was set to work.

Somewhere near 1 million cu yd of excavation had to be completed, and trestles 1-2-3-6 erected as well as the revolver and cantilever cranes necessary to place concrete, penstocks and other metal work. There are six cranes, all told, and two stiffleg derricks with 185 ft booms.

Now, 24 months later, the concrete in place totals 2,228,520 cu yd with the average height of the structure in excess of 250 ft.

To date, including the diversion tunnels, roads, foundation and plant, excavation totals some 8.7 million cu yd.

Total concrete in place, including diversion tunnels, is approximately 2,360,000 cu yd. About 48 million lb of the usual type of metal work has been placed, not including the plant or railroad.

Yet, to be done is some 1,250,000 cu yd of excavation for the right powerhouse and some 3.1 million cu yd of concrete, plus the usual metal work for river outlets, power wheels, generators, spillway gates, etc.

Khushchev can put Sputniks out, but we U.S.A. citizens with the help of the Indians can still build dams.

M. H. Slocum
General Project Manager
Bhakra Dam

Surveyors and Engineers

Sir—Under the present laws of Florida, a surveyor may run boundaries, register plats and do work incidental thereto. Construction surveys, site investigations and the like are the strict property of engineers, who in many cases hire land surveyors to do the actual work under their supervision.

Why not license those land surveyors who are qualified to do this type of work? Most of the present crop of land surveyors learned land surveying from sources other than college and would therefore have a tough time qualifying as designers, a requirement of most professional engineer examinations. But they are professional men in the fullest sense of the word. To my mind, they should be given professional status.

William W. Fulford
Daytona Beach, Fla.

Editor's Note: Land surveyors are licensed in 36 states but not necessarily to do work on construction, as Mr. Fulford points out. In 26 states there are numbers of individuals who have qualified legally both as engineers and land surveyors. As of June, 1957, Florida, the case in point, had 2,148 registered

(*Continued on p. 12*)

Sectional view of new UDT-1091 Turbotorque diesel engine. Engine bhp (less fan): 300 max. output; 265 intermittent; 215 continuous @ 1,500 rpm.

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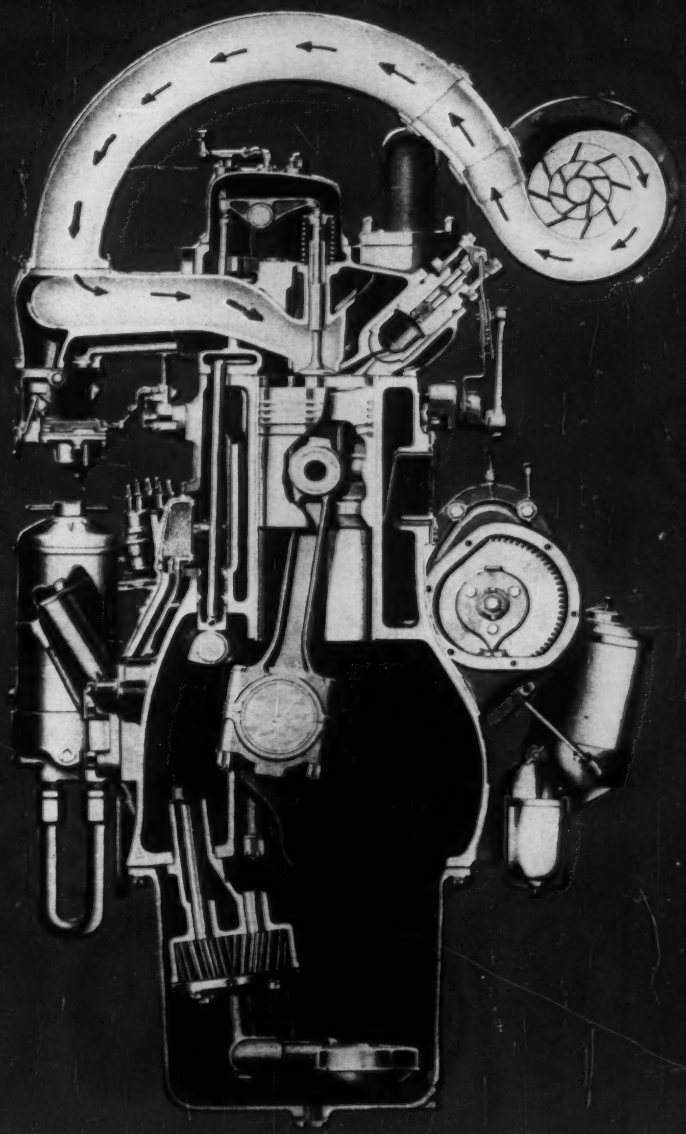

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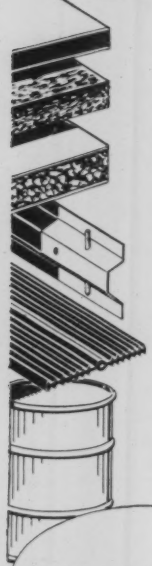

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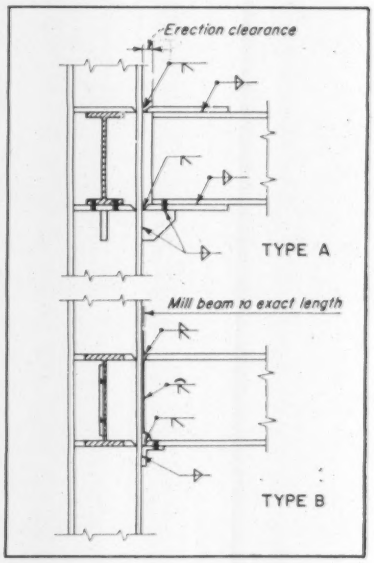
engineers, 301 registered as both engineer and land surveyor, and 374 land surveyors not qualified under the law to take supervision of construction surveys. See this week's editorial page for more on this question.



Which Joint Is Better

SIR—I have often been faced with the problem of designing a typical moment connection applicable to a great number of connections in a multi-story building. The choice has been between the two types of moment connections most commonly used, the type using top and bottom splice plates (Type A) and the butt-welded type (Type B).

Type A provides for erection clearance, thereby making erection easier; whereas, Type B is a better connection from a structural point of view, having less welding and a smoother transfer of stresses from beam to column.

Since both types have their advantages and disadvantages, the decision as to which type to use is often difficult. It would be worth while if this matter was taken up for discussion, especially if fabricators and erectors let their point of view be known.

A. W. FINNE
Bechtel Corp.
San Francisco, California

Curricula Questioned

SIR—I enjoyed the varied acceptance of the problem outlined in the article, "Can Construction be Taught in College," (ENR Nov. 7, 1957, p. 23).

Colorado University has for many years offered a concurrent program in engineering and business leading to a

Bachelor of Science degree in each field. It was for this reason alone I chose to attend CU, and the experience exceeded my expectations.

During the intervening years since graduation I have met at interview many employers, and each has remarked in the same vein: "This is an excellent background and should lead to stations of responsibility and success, but we need engineers per se for . . ." and then they define technical responsibilities.

Industry has apparently not given much weight to this dual pursuit of the embryo engineer. Most companies have an established managerial training program and select trainees guided by a company originated yardstick. Engineering per se does not alone satisfy the scientific mind, and it should be prima facie evidence that any engineer with the diverse background is serious about an ultimate administrative pursuit using his technical knowledge as a lever.

VINCENT G. SHERIDAN
Catskill, N. Y.

Correction

Several captions in the picture story showing Soviet hydro projects (ENR Dec. 12, p. 26) were mixed. The captions should be unscrambled as follows: Novosibirsk for Stalingrad, Stalingrad for Kairak-Kum, and Kairak-Kum for Novosibirsk. As further identification, the Novosibirsk and Stalingrad jobs featured the unusual whirler cranes while Kairak-Kum makes extensive use of precast concrete panels.

CALENDAR

Highway Research Board, annual meeting, Sheraton-Park Hotel, Washington, D. C., Jan. 6-10.

National Association of Home Builders, annual meeting, Conrad Hilton Hotel, Chicago, Ill., Jan. 19-24.

American Road Builders Association, annual meeting, Sheraton-Park Hotel, Washington, D. C., Jan. 20-23.

Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Ill., Jan. 26-30.

American Society of Heating and Air-Conditioning Engineers, annual meeting, Penn-Sheraton Hotel, Pittsburgh, Pa., Jan. 27-29.

National Bituminous Concrete Association, annual convention, Flamingo Hotel, Las Vegas, Nev., Feb. 3-6.

National Society of Professional Engineers, spring meeting, Michigan State University, East Lansing, Mich., Feb. 13-15, 1958.

Association of Asphalt Paving Technologists, Sheraton-Mt. Royal Hotel, Montreal, Canada, Feb. 17-19.

American Concrete Institute, annual convention, Morrison Hotel, Chicago, Ill., Feb. 24-27.

American Congress on Surveying and Mapping-American Society of Photogrammetry, 1958 consecutive meetings and co-exhibit, Shoreham Hotel, Washington, D. C., Mar 23-29.

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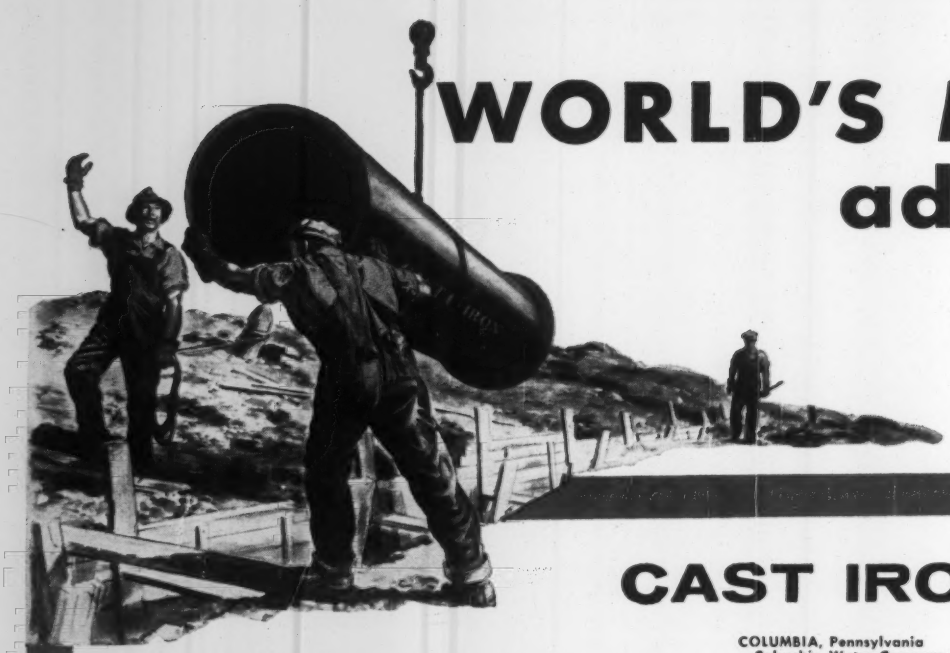

WORLD'S MOST adds 20

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*ADRIAN, Michigan
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ALBANY, New York
Dept. of Water and Water Supply

ALBANY, New York
Niagara Mohawk Power Corp. (Gas)

ALEXANDRIA, Virginia
Alexandria Water Company

ALLENTOWN, Pennsylvania
Bureau of Water

*ALTON, Illinois
Union Electric Company, Gas Division

ATLANTA, Georgia
Atlanta Gas Light Company

BALTIMORE, Maryland
Bureau of Water, Dept. of Public Works

BALTIMORE, Maryland
Baltimore Gas and Electric Company

*BANGOR, Maine
Citizens Utilities Company, Gas District

*BETHLEHEM, Pennsylvania
The United Gas Improvement Company

BOSTON, Massachusetts
Public Works Dept., Water Division

BOSTON, Massachusetts
Boston Consolidated Gas Co.

BOUND BROOK, New Jersey
Public Service Electric & Gas Co.

BRIDGEPORT, Connecticut
Bridgeport Gas Light Company

BUFFALO, New York
Dept. of Public Works, Div. of Water

*CAMBRIDGE, Massachusetts
Cambridge Water Board

*CARLISLE, Pennsylvania
The United Gas Improvement Co., Gas Division

*CATASAUQUA, Pennsylvania
The United Gas Improvement Company

*CHAMBERSBURG, Pennsylvania
Borough of Chambersburg, Gas Department

CHARLESTON, South Carolina
South Carolina Electric & Gas Co.

CHICAGO, Illinois
Peoples Gas Light & Coke Company

CHICAGO, Illinois
Water Works Department

CINCINNATI, Ohio
Cincinnati Gas & Electric Co.

COLUMBIA, Pennsylvania
Columbia Water Company

DETROIT, Michigan
Board of Water Commissioners

DETROIT, Michigan
Michigan Consolidated Gas Co.

ELIZABETH, New Jersey
Elizabethtown Consolidated Gas Co.

EVANSVILLE, Indiana
Southern Indiana Gas & Electric Co.

FALL RIVER, Massachusetts
Fall River Gas Works Company

FREDERICK, Maryland
City of Frederick Water Dept.

FREDERICK, Maryland
Frederick Gas Company, Inc.

CITY OF FREDERICKSBURG, Virginia
Gas Department

*HAGERSTOWN, Maryland
Hagerstown Gas Company

HALIFAX, Nova Scotia
Public Serv. Co., Public Water Supply

*HARRISBURG, Pennsylvania
The United Gas Improvement Co., Harrisburg Gas Div.

HARTFORD, Connecticut
The Hartford Gas Company

HARTFORD, Connecticut
Water Bureau, Metropolitan District

HUNTSVILLE, Alabama
Municipal Water Works

INDIANAPOLIS, Indiana
Citizens Gas & Coke Utility

KNOXVILLE, Tennessee
Knoxville Utilities Board (Gas)

*LAMBERTVILLE, New Jersey
City Gas Company

LANCASTER, Pennsylvania
Bureau of Water

LOUISVILLE, Kentucky
Louisville Gas & Electric Co.

LYNCHBURG, Virginia
City of Lynchburg Water Dept.

MADISON, Indiana
Natural Gas Service, Inc.

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MOBILE, Alabama
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***NANTUCKET, Massachusetts**
Nantucket Gas & Electric Company

NASHUA, New Hampshire
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New Orleans Public Service Inc. (Gas)

NEWARK, New Jersey
Public Service Electric & Gas Co.

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Dept. of Water, Gas & Electricity

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Philadelphia Electric Co., Gas Dept.

***NORWICH, Connecticut**
Department of Public Works, Gas Division

***OTTAWA, Ontario**
Ottawa Gas

PAINESVILLE, Ohio
City of Painesville, Gas Distribution Dept.

PEORIA, Illinois
Central Illinois Light Company

PHILADELPHIA, Pennsylvania
Dept. of Public Works, Bureau of Water

PHILADELPHIA, Pennsylvania
Philadelphia Gas Works Co.

PITTSBURGH, Pennsylvania
Bureau of Water, Dept. of Public Works

PLYMOUTH, Massachusetts
Plymouth Gas Light Company

POTTSVILLE, Pennsylvania
Pottsville Water Company

***POUGHKEEPSIE, New York**
Central Hudson Gas & Electric Corporation, Gas Division

PROVIDENCE, Rhode Island
Providence Gas Company

QUEBEC, Quebec
Quebec Power Co., Gas Division

READING, Pennsylvania
Bureau of Water

RICHMOND, Virginia
Department of Public Utilities (Gas)

RICHMOND, Virginia
Dept. of Public Utilities (Water)

ROCHESTER, New York
Rochester Gas & Electric Corp.

SACRAMENTO, California
Division of Water & Sewers

ST. JOHN, New Brunswick
Water & Sewerage Department

ST. LOUIS, Missouri
Dept. of Public Utilities, Water Div.

SALEM, Massachusetts
North Shore Gas Company

***SANDUSKY, Ohio**
The Ohio Fuel Gas Company

SAVANNAH, Georgia
South Atlantic Gas Company

SPRINGFIELD, Illinois
Central Illinois Light Company

SYRACUSE, New York
Water Div., Dept. of Engineering

TORONTO, Ontario
The Consumer's Gas Co. of Toronto

TROY, New York
Department of Public Works

UTICA, New York
City of Utica, Board of Water Supply

***WASHINGTON, D. C.**
Washington Gas Light Company

WHEELING, West Virginia
City of Wheeling Water Department

WILLIAMSPORT, Pennsylvania
Williamsport Municipal Water Authority

WILMINGTON, Delaware
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WINCHESTER, Virginia
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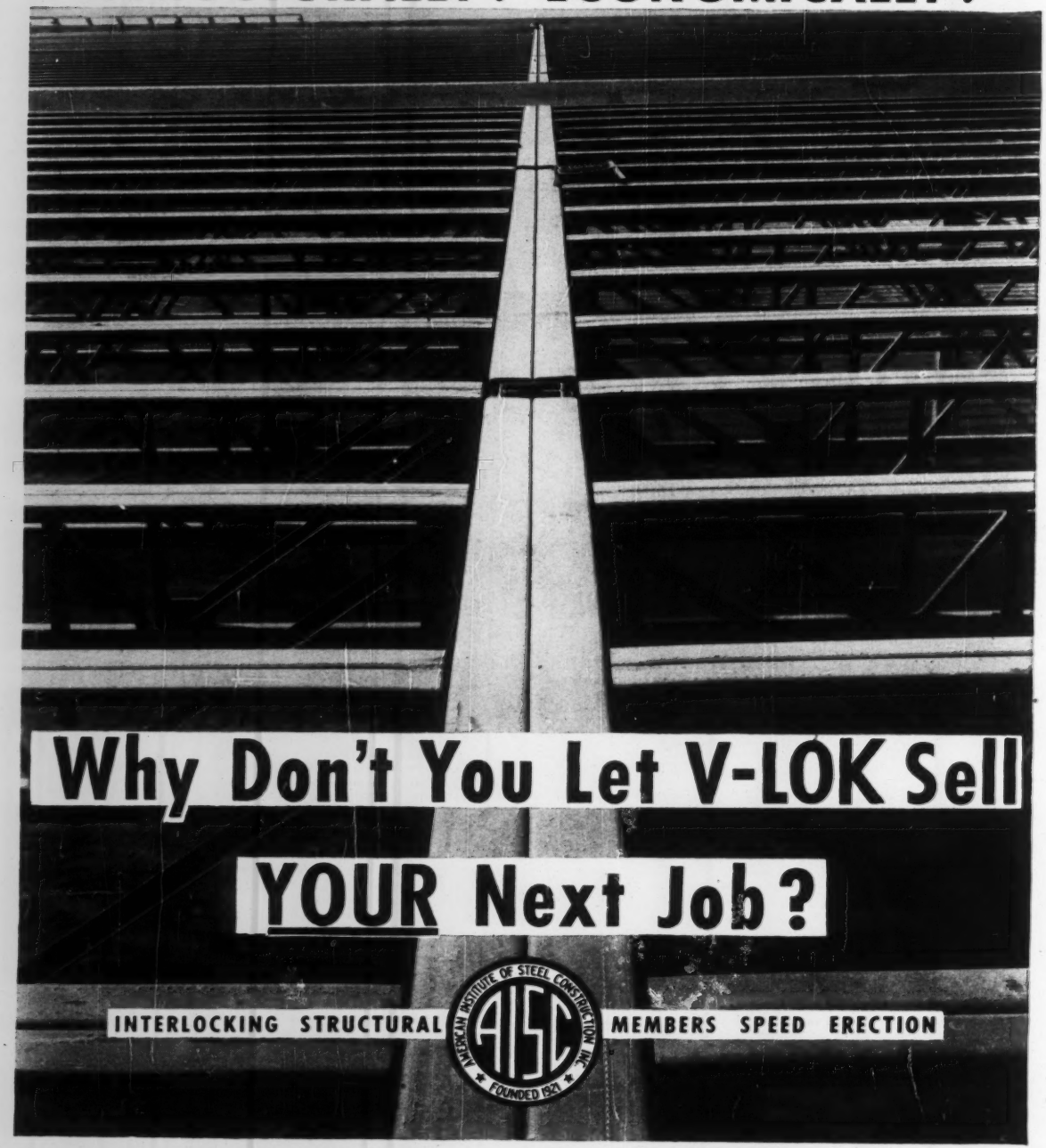

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

SIGN OF THE TIMES—Noted without comment from the 44th annual report of the Pasadena, Calif., Water Department published last week: ". . . The Sheldon Reservoir was reroofed (last year) using galvanized corrugated steel supported by Douglas fir framing and redwood columns. The new roof covers 64,000 sq ft. It is of interest to note that the original roof was constructed in 1917 using 1 x 12 sheeting for $4,308. The new roof, designed as an earthquake-proof structure, cost $101,000. This is an increase of 2,245%."

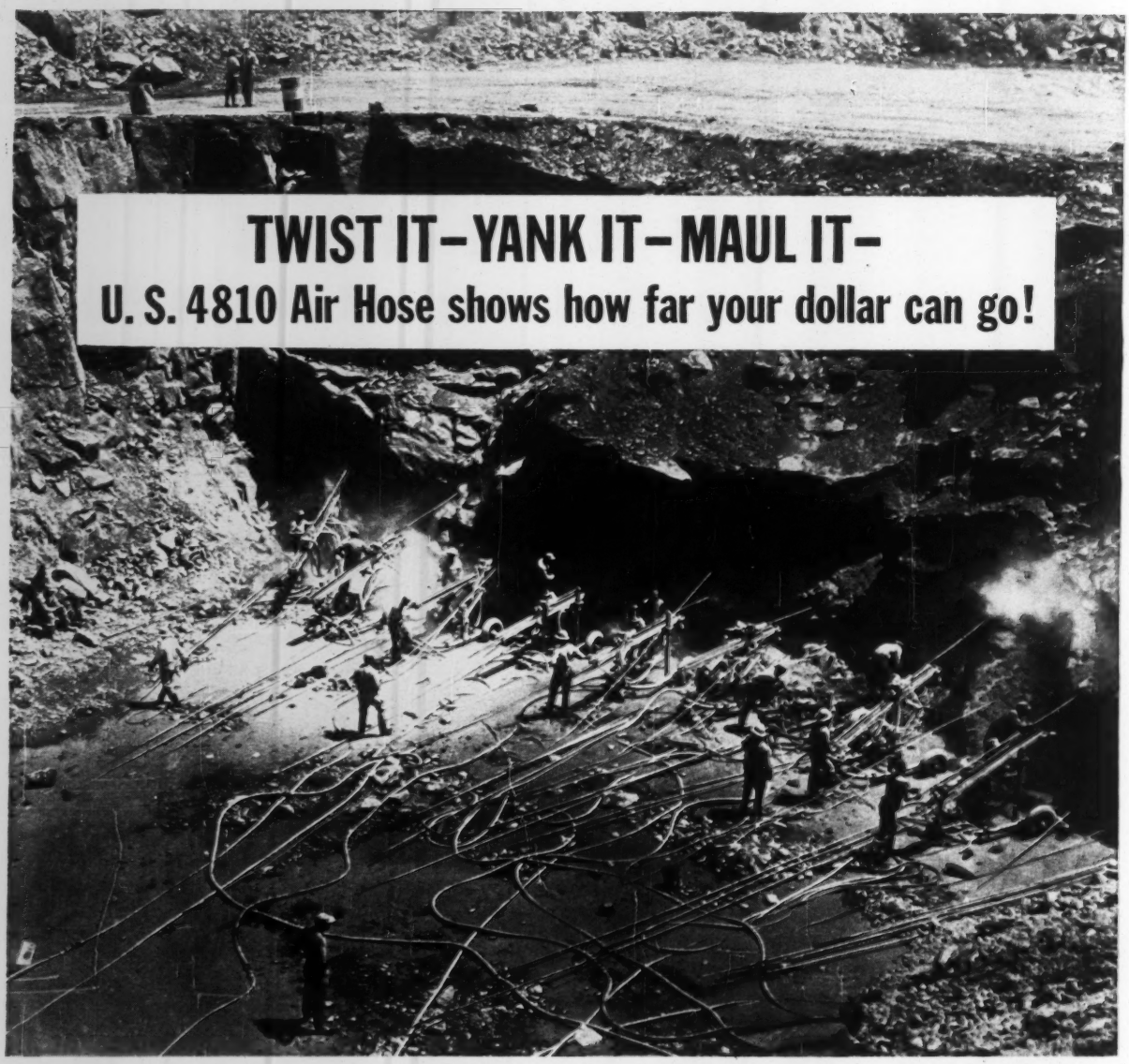
ORSANCO REPORTS PROGRESS—Sewage treatment plants to serve 86 of every 100 sewered persons along the mainstem Ohio River are now in operation or under construction. So reports the Ohio River Valley Water Sanitation Commission this week in its ninth annual summary to governors of its eight participating states. When Orsanco got started in 1948, only one of every 100 people with sewers was served by an operating purification facility.

PICK YOUR COLOR—The U. S. Bureau of Public Roads to the contrary, Wyoming State Sen. Dean Rudy Anselmi likes yellow center lines on Wyoming highways. He's planning to introduce a bill in the 1959 legislative session requiring yellow center striping. Problem is, according to state highway officials, that BPR recommendations (adopted by 46 states so far) call for white center lines—and the state engineers are worried that non-conformance may hold up Wyoming's federal money. Makes no difference, says Senator Anselmi—he likes yellow, thinks it more visible in snowstorms.

CAVEAT EMPTOR—Contractors should be very careful where they buy used construction machinery in the near future, according to the Los Angeles Police Department. A series of thefts of heavy equipment—including a three-month old TD 9 International tractor with equipment—has been reported. An innocent purchaser would lose both the machine and his purchase price, if the rig proved to be stolen.

FEE WOES ON OAHU—Honolulu officials are wondering what to do about being fairly regularly short changed on building permit fees. A territorial government appraiser estimates that after the last 10 years undervaluations of building costs at the permit stage have cost the city-county "hundreds of thousands of dollars". Fees are based on the estimated value of the structure. In one case, a hotel building was supposed to cost $2.1 million according to the permit application, but on completion it was appraised at $4 million. Similar differences of more than $1 million each were noted in two other instances. THE HONOLULU STAR BULLETIN reported that its own cross check of contractors' estimates against tax appraisals on seven recently built hotel and business buildings picked at random showed undervaluations totaling $5 million.

AIR HOSE



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WASHINGTON OBSERVER

- Turn-around on public works
- St. Lawrence Seaway costs down
- More pay for the professors

● **There are signs of an Administration turn-around on public works spending.** Only a few weeks ago, the word was still hard and clear from White House and Budget Bureau to the public works agencies—housing, reclamation, engineers and the military: No new starts were to be allowed, and projects under construction should go ahead at the slowest economical rate.

Now, the indications are that this budget hold-down is just about ended. The military ceiling disappeared when the second Soviet Sputnik started orbiting. From then on, it was clear that any construction needed to further our defenses in the space age won't be rejected on the grounds that it's something we can do without. Dispersal of bomber bases at home, completion and expansion of bases overseas, a start on new missile bases here at home and abroad, and extension of advanced warning systems have easily been approved.

The fight for cut-backs on non-military spending is being lost in favor of a more vigorous Administration fight against a recession. The first signs came with the release by the White House of $177 million of housing funds that had been held up. These provide an immediate shot in the arm. While this action by itself won't stop the business slide, it is precisely the kind of federal aid the Administration has always said it would turn to when the business outlook became bleak.

On big public works, the Administration's budget will include funds for projects that are prime targets for budget-cutters. Key Republicans in Congress now promise that the Administration will ask for money to start the $83 million water storage and power dam at Flaming Gorge, part of the huge Upper Colorado storage project authorized a year ago. This is in spite of the fact that deferral of such a start is precisely the kind of dollar-saving the Administration had counted on to help its fight for a balanced budget.

—

● **The President's budget message will show that St. Lawrence Seaway construction will cost less than estimated last year.** This will be good news for those worried about skyrocketing Seaway costs and the attendant higher toll charges which might reduce volume of use by shippers.

The new estimate will be around $127 million, compared with a figure of $133 million given to Congress last spring. The reduction is largely the result of the decision by U. S. officials to use the Army Engineers to dredge the South Cornwall Channel of the river's International Rapids section. The decision came after bids from private contractors that were substantially higher than federal estimates. The dredging has now progressed to the point where U. S. officials are certain of the savings they thought they could make—perhaps even more.

—

● **More pay for teachers of science, mathematics and engineering at high schools and colleges seems certain now,** following the Administration's decision this week to back a $1.8 billion aid-to-education program over the next four years. It's one of the major reactions to fill the gaps in U. S. science revealed when the Sputniks forced a new look at our educational needs.

LOCK JOINT ECONOMIES: *One of a Series*

It's a bargain!

If Peter Minuit were alive today probably nobody would be more surprised than he at the extent of the bargain he made with the Indians for Manhattan. His $24 investment now has an assessed valuation of more than $7,000,000,000.

But no one should be surprised at the value offered by LOCK JOINT CONCRETE PRESSURE PIPE. For a great many years the low first cost of this pipe has been assured by keen competitive bidding, its simplicity and speed of installation have helped to reduce construction costs, its record for dependable, trouble-free service has been unexcelled and its operational and maintenance costs have been minimal.

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A year ago, these were the top ten contractors . . .

(Based on individually held contracts — joint ventures not included — awarded in '56)

1. Koppers Co., Inc., Engineering & Construction Div., Pittsburgh . . . . . with contracts of $247.5 million
2. George A. Fuller Co., New York . . . . . $209.3 million
3. Stone & Webster Engineering Corp., Boston . . . . . $188 million
4. Arthur G. McKee & Co., Cleveland . . . . . $187.3 million
5. Turner Construction Co., New York . . . . . $181.3 million
6. Booth & Flinn Co., Pittsburgh . . . . . $150 million
7. F. H. McGraw & Co., Hartford . . . . . $142 million
8. United Engineers & Constructors, Inc., Philadelphia . . . . . $137.5 million
9. Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif. . $129.1 million
10. Bechtel Corp., San Francisco . . . . . $128.8 million

ENR Spotlights 62 Biggest Contractors

Who's who among the big contractors?

What firms sign up the most new business in a year?

The answers to these questions provide a moving picture of the industry because each year presents a different list.

But the last two years—1956 for which data are given, and 1957, on which the books are not yet closed—will go on record as years in which the top positions were radically changed.

One reason for the big shift: a change in emphasis from private to public work. This type of shifting will continue in 1958. In 1956, the commercial and industrial building boom swept to a peak, and carried along on this wave of work were construction companies engaged in private building.

• **How they hit the top**—Based on contracts reported to CONSTRUCTION DAILY and ENR, 62 contractors in 1956 participated in work exceeding $40 million in value. Of 62 firms, 18 topped $100 million, five topped $200 million.

There were three routes to the top spots:

• Through a firm's own individual contracts.

• Through a combination of individual contracts and participation with other firms in one or more joint ventures.

• Through participation in one or more joint ventures.

No carryover work from earlier contracts was counted. The total represents only reported new business signed up for jobs in the U. S. during the 1956 calendar year. Companies in joint ventures are given credit for taking part in the total amount of the joint venture contract, regardless of what the actual percentage of participation actually may have been.

Comparing the current tabulation with one prepared by CD and ENR in 1952, it is apparent that a change in rank occurs from year to year.

The lists also serve to underline the dollar volume growth of construction as an industry.

• **Comparison with the past**—For example, during 1952 only four companies in the individual contract category had been awarded contracts whose cumulative total ran over $100 million. But during 1956, the number of companies whose individual contracts amounted to more than $100 million jumped to eight.

In addition, the top ranking company in 1952—Austin Co. of Cleveland—won contracts amounting to $132.2 million. However, during 1956, the first-rated firm in the individual contract group held contracts totaling $247.5 million. This was Koppers Co., Engineering & Construction Division, Pittsburgh.

As a group, the four companies whose contracts in 1952 totaled over $100 million ran up a cumulative total of $448 million. But in 1956 the eight firms in the same class had contracts totaling $1.2 billion. Obviously, the big ones got bigger.

This is further borne out in the group of over $40 million in individual contracts but under $100 million. In 1952, there were 10 firms whose new contracts exceeded $40 million. The cumulative total was $581 million. The current list shows 16 companies in that category with cumulative volume amounting to $940.2 million.

The list of top firms comprising those

. . . the firms that signed contracts totaling over $40 million

. . . Some did it by individually held contracts alone

	Millions
Over $100,000,000	
Koppers Co., Inc., Engineering Construction Div., Pittsburgh, Pa.	$247.5
Arthur G. McKee & Co., Cleveland, Ohio	187.3
F. H. McGraw & Co., Hartford, Conn.	142.0
United Engineers & Constructors, Inc., Phila., Pa.	137.5
Bechtel Corp., San Francisco, Calif.	128.0
Merritt-Chapman-Scott Corp., New York	124.0
Bethlehem Steel Co., Construction Div., Bethlehem, Pa.	112.0
Foster Wheeler Corp., New York	100.4
$40,000,000—$100,000,000	
Dravo Corp., Pittsburgh, Pa.	$ 91.0
Gust K. Newberg Constr. Co., Chicago, Ill.	82.3
American Bridge Div., U. S. Steel Corp., Pittsburgh, Pa.	81.7
Shubow & Hollo, Detroit, Mich.	80.0
Fluor Corp. Ltd., 2500 Atlantic Blvd., Los Angeles, Calif.	62.9
Ebasco Services Inc., New York	59.5
H. B. Zachry, Co., Construction Div., San Antonio, Tex.	54.0
Guy F. Atkinson & Co., South Francisco, Calif.	53.3
Ragnar Benson, Inc., Chicago, Ill.	52.4
Robert E. McKee General Contractor, Inc., El Paso, Tex.	52.0
Park Land Development Co., Parma 29, Ohio	50.0
Hilp & Rhodes, San Francisco, Calif.	46.5
Pacific Iron & Steel Co. of Los Angeles, Calif.	45.0
Diesel Constr. Co., Inc., New York	44.0
James H. Pomeroy & Co., Inc., San Francisco, Calif.	42.9
M. W. Kellogg Co., New York 17, N. Y.	42.7

. . . And these made the list solely through joint ventures

	Millions
$40,000,000—$100,000,000	
Kaighin & Hughes, Inc., Toledo, Ohio	$ 77.5
Edenfield Electric Inc., Nashville, Tenn.	77.5
Walsh Const. Co., New York	67.4
Babcock & Wilcox Co., New York	50.0
Frazier-Davis Constr. Co., St. Louis, Mo.	45.6
Midwest Piping Co., Inc., St. Louis, Mo.	40.0
Wyatt & Kipper Engineers, Inc., Seattle, Wash.	40.0

. . . Others made the mark with

Over $100,000,000
George A. Fuller Co., New York
Stone & Webster Engineering Corp., Boston, Mass.
Morrison-Knudsen Co., Inc., Boise, Idaho
Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif.
Turner Constr. Co., New York
Perini Corp, Framingham, Mass.
Booth & Flinn Co., Pittsburgh, Pa.
Austin Co., Cleveland, Ohio
Peter Kiewit Sons' Co., Omaha, Neb.
J. A. Jones Constr. Co., Charlotte, N. Car.
$40,000,000—$100,000,000
Daniel Constr. Co., Inc., Greenville, S. Car.
Macco Corp., Paramount, Calif.
John Lowry, Inc., New York
Charles H. Tompkins Co., Washington, D. C.
George M. Brewster & Son, Inc., Bogota, N. J.
Terminal Constr. Corp., Woodbridge, N. J.
Lummus Co., New York
Oman Constr. Co., Nashville, Tenn.
Massman Constr. Co., Kansas City, Mo.
Utah Constr. Co., Salt Lake City, Utah
H.R.H. Constr. Corp., New York
S. A. Healy Co, White Plains, N. Y.
L. E. Dixon Co., San Gabriel, Calif.
Hunkin-Conkey Constr. Co., Cleveland, Ohio
MacDonald Constr. Co., St. Louis 4, Mo.
Houston Contg. Co., Houston, Tex.
A. S. Horner Constr. Co., Denver, Colo.
S. J. Groves & Sons Co., Minneapolis, Minn.
Arundel Corp., Baltimore, Md.
LaFera Contg. Co., Newark, N. J.
Colorado Constructors, Inc., Denver, Colo.

whose new contracts totaled over $40 million through individual contracts and participation in joint ventures shows the same growth as is evident in the individual contract section.

In 1952, there were 13 companies in this category. But the most recent listing shows that 31 companies made the list. Within this same overall grouping, five companies held individual contracts and participated in joint ventures whose total ran over $100 million in 1952.

But in 1956, there were 10 companies in the over $100 million group.

• **What they are—**

1. Koppers: Heinrich Koppers of Germany devised a better method than the one then in use early in the century for heating chemical-recovery coke ovens. Word spread and he was asked to build a battery of ovens for a Midwest steel firm. Such ovens eventually became the standard of the steel industry and from this venture grew the present corporation. Because of special know-how required, the Koppers Construction Co. was organized as the forerunner of the firm's present engineering and construction division.

2. Fuller: Founded 76 years ago by George A. Fuller, this company is a pioneer in skeleton steel construction, having built the first steel frame skyscraper in 1885—Chicago's Tacoma Building. Among other "firsts" is construction of the House of Seagram Building in New York City, which features a bronze facade.

3. Stone & Webster, Inc.: This is the parent company to the engineering corporation, and nine other subsidiaries. Design and construction are the parent's major sources of income. It designs and builds for utility and manufacturing firms. Its Badger Process Division designs and constructs facilities for the petroleum, chemical and pharmaceutical industries.

4. Arthur G. McKee: The company was established in 1905 under the name of A. G. McKee, Engineer, and was incorporated under its present name in 1920. Today it does engineering and construction for the iron, steel and petroleum industries. Among the company's top 1956 contracts was the Fairless Works at Morrisville, Pa., built for United States Steel Corp. The firm also serves as a consultant in engineering to the same industries.

5. Turner: H. C. Turner, Sr., established the company in New York City in 1902. The company was a leader in the construction of reinforced concrete structures. Since 1902, the firm's gross dollar volume, adjusted to present dollar values, exceeds $3 billion and

worth in 1956 . . .

the help of joint ventures

	Total	Indiv.	Joint Vent.
. . . .	$279.3	$209.3	$70.0
. . . .	238.0	188.0	50.0
. . . .	223.4	74.8	148.6
. . . .	209.1	129.1	80.0
. . . .	193.4	181.3	12.1
. . . .	166.8	30.1	136.7
. . . .	157.9	150.0	7.9
. . . .	141.7	112.3	29.4
. . . .	133.1	74.8	58.3
. . . .	110.3	44.6	65.7
. . . .	86.8	9.3	77.5
. . . .	80.4	.4	80.0
. . . .	71.6	1.6	70.0
. . . .	69.6	11.9	57.7
. . . .	64.7	16.2	48.5
. . . .	58.4	21.6	36.8
. . . .	57.0	37.0	20.0
. . . .	53.5	51.4	2.1
. . . .	49.9	5.1	44.8
. . . .	47.4	19.6	27.8
. . . .	46.9	38.3	8.6
. . . .	46.7	7.8	38.9
. . . .	46.4	2.1	44.3
. . . .	45.5	17.4	28.1
. . . .	44.0	4.0	40.0
. . . .	42.9	26.9	16.0
. . . .	42.7	3.8	38.9
. . . .	41.6	39.6	2.0
. . . .	41.5	7.2	34.3
. . . .	41.0	4.2	36.8
. . . .	40.5	1.7	38.8

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represents construction of more than 3,000 buildings.

6. **Booth & Flinn:** This Pittsburgh construction firm in 1956 held individual contracts for industrial construction amounting to $150 million and also participated in a $7.9 million joint venture on a highway and bridge project in Pennsylvania.

7. **F. H. McGraw:** This firm has its headquarters in Hartford, Conn., and offices in New York, Pittsburgh and Chicago. It now has ties with Olin Mathieson Chemical Corp. through a stock transaction. The McGraw firm has a subsidiary company, McGraw Terminal, Inc., which is developing a terminal and industrial area in Louisiana.

8. **United Engineers & Constructors:** Headed by Henry M. Chance II, and located in Philadelphia, this is an industrial and commercial construction firm. Its $137.5 million in new 1956 contracts were all industrial, except one. Its individual contracts that year ranged from a $300,000 machine shop to a $129 million electric generating station.

9. **Kaiser Engineers**—This division of Henry J. Kaiser Co., the latter dating back to 1914, operates a world-wide engineering and construction business. Although its new contract participation in 1956 was primarily industrial, its operations include roadbuilding, earthfill dams, breakwaters, levees and concrete dams. The division administers joint ventures as well as individual projects in the heavy construction fields.

10. **Bechtel:** During 1956, this firm's engineering and construction activities were primarily in the industrial field. The company is equipped to sell any service a client asks, from management of a project with no direct building, to a complete turnkey job. Its largest contract in 1956 was $30 million for construction of an alumina plant near Corpus Christi, Tex.

Total awards volume off in 1957, but . . .

Public Works Climbed by 17%

During 1957, public works was a star performer (see table below). For the full year, federal and state and municipal contracts totaled $9.6 billion, a gain of 17% over 1956's $8.2 billion in awards. The jump in public works is only the second time since 1949 when awards in this group topped private work. In 1952, atomic power awards served to push the public works sector ahead of private construction.

In the public works group, federal awards during 1957 jumped 29% with awards of $2.2 billion in comparison to $1.7 billion in 1956.

State and municipal contracts gained 14% last year with $7.4 billion in comparison to $6.5 billion in 1956.

Private contract awards, on the other hand, dropped 38% from the 1956 figure to a total of $8.4 billion, while 1956 had awards of $13.5 billion.

In the overall 1957 picture, all U. S. contract awards came to slightly less than $18 billion as compared to the 1956 total of $21.8 billion. This was a decline of 17%.

• **Where the contracts went**—The sharp swings between 1956 and 1957 within the two categories of private and public work provide a dramatic clue to impending trends. In public work, earthwork and waterworks picked up 33% in contract volume during 1957 with a total of $969 million as compared to 1956's volume of $730 million. Bridge contracts gained 26% in 1957 with award volume coming in at $781 million, while in 1956 awards amounted to $623 million. Highways, stimulated by the federal-aid interstate program, picked up 20% in 1957 with contract awards amounting to $3 billion. During 1956, volume tallied $2.5 billion.

Waterworks had awards of $369 million in comparison to 1956 volume of $356 million for a gain of 4%. Sewerage was the only sector within the public work category to show a decline—4%—with 1957 volume of $556 million as against 1956 awards totaling $579 million. (It was in 1956 that Allegheny County, Pa., contracted for its $80 million works.)

Public housing last year soared 102% over 1956 with awards of $642 million and $318 million, respectively.

Public buildings, excluding housing, jumped 12% in 1957 with a total of $2.4 billion as compared to slightly less than $2.1 billion in 1956.

• **Private work suffers**—In the private contract awards category, private housing, industrial building and commercial building—in that order—took a beating last year. Housing fell 43% from $5.3 billion in 1956 to $3 billion.

Industrial building toppled 42% from the 1956 total of $5.3 billion to $3 billion. And commercial building registered $1.8 billion in awards as against $2 billion in 1956 to show 14% decline.

All unclassified work slumped 20% last year with awards of $1.5 billion compared to $1.8 billion in 1956.

AMOUNT OF CONTRACTS LET IN 1957

Millions of dollars

	1957	1956	% Chge
BY OWNERSHIP			
Federal	$2185	$1689	+29
State and municipal	7415	6533	+14
Total public	9600	8222	+17
Total private	8386	13,490	−38
U. S. Total	$7986	$21,712	−17
BY TYPE OF WORK: (Heavy Construction)			
Waterworks	$369	$356	+ 4
Sewerage	556	579	− 4
Bridges	781	622	+26
Highways	2965	2475	+20
Earthwork, waterways	969	730	+33
BY TYPE OF WORK: (Buildings)			
Public, excl. housing	2353	2099	+12
Public housing	642	318	+102
Private housing	3041	5306	−43
Commercial	1754	2051	−14
Industrial	3081	5335	−42
Unclassified	1475	1841	−20
U. S. Total	$17,986	$21,712	−17

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial, $93,000; other buildings, $344,000.

Taking Rail Property for Road Is Banned

Court restrains city from building interchange; ruling could have major effect on interstate highway program

In a decision that could have a major effect on the national highway program, the North Carolina Supreme Court ruled that a city cannot condemn railroad property for street improvements under existing state law.

The court's action restrained the city of Greensboro from proceeding with construction to relieve a traffic bottleneck despite the city's claim that the removal of part of the right-of-way of the Southern Railway would not damage the railroad and was urgently needed to make way for a traffic intersection.

The case in point is the city's attempt to build an interchange at the intersection of Battleground Ave., Lawndale Ave., and Westover Terrace, at a point crossed by the Southern Railway's tracks. The railroad's action has stalled the project.

In sending the matter back to county courts for trial, the state's high court said: "Land once appropriated by a railroad company for public use cannot in the absence of statutory authority be condemned for streets or highways if such purpose would be inconsistent with and impair or destroy its use for railroad purposes."

• **Understands concern**—In its opinion, the Supreme Court said that the concern of the city and the public over the traffic bottleneck which has resulted from suspension of work by court orders is quite understandable. "However," the court commented, "it must be borne in mind that the city had notice that the railway company objected to the plan." Greensboro had proceeded at its own risk with the project, before its dispute with the railroad had been settled, and the city may be faced with the problem of restoring the property to its former condition.

"Notwithstanding that an authority (the city) may act in utmost good faith, something more is required than merely adopting a plan, transmitting it to the owner and entering a contract," the court declared. "Due process involves more than notice—the acquisition of property by condemnation is limited to forfeitures and contraband. The city had notice the railway company objected; and instead of going to court to have the dispute determined, the city elected to execute its plan. The record discloses that the city had acquired rights-of-way for this project from all owners except the railway."

• **Busy crossing**—the highway intersection in question is said to be one of the busiest in the state, with a traffic of more than 25,000 vehicles per day at peak periods.

However, said the court, "While the findings (of a lower court) may be sufficient to enable the city to exercise its power of eminent domain to take private property for the uses indicated, the city here attempts to take property of another public service agency, also possessing the power of eminent domain, when the property is already in public use and alleged by the plaintiffs to be necessary for that use."

A dissenting opinion, filed by Associate Justice R. Hunt Parker, supported the original lower court ruling on the ground that public interest in the street matter was so weighty that the street work should proceed.

Highway Bureau Trims Its Maintenance Personnel

Striving to streamline the department's operation, Kentucky's newly appointed Highway Commissioner, James W. Martin, has announced a cutback of 664 maintenance workers, 27 supervisors and all 19 highway investigators.

Explaining the move, Mr. Martin said that the maintenance and supervisory personnel were chopped from the employment rolls because there were too many of them. The investigator's staff was abolished because it had "completely or partly failed to produce service," Mr. Martin added.

Also affected in the sweeping cutback orders were two part-time attorneys, and district engineers, who were ordered to reduce the number of their employees "if they can reasonably do so."

Turnpike Link Studied By Indiana and Illinois

The possibility of connecting the 156 mile Indiana tollroad and the 187 mile Illinois toll highway system is now under study by officials of these two states.

According to Albert J. Wedeking, Executive Director of the Indiana Toll Road Commission, the study was initiated at the request of the Illinois State Toll Highway Commission. The Illinois group suggested a connection via the tri-state highway in Lake County, Ind., and Kingery Expressway in the State of Illinois.

Commenting on the proposal, Mr. Wedeking said he would recommend to his own commission that it authorize the New Haven firm of Wilbur Smith & Associates—regularly employed as traffic consultants—to make a preliminary study to determine if the proposed connection would generate enough additional traffic to make feasible construction of a new interchange on the Indiana road. In addition, he said that engineering representatives of the Indiana commission will meet with State Highway Department engineers to discuss problems that might be encountered.

Los Angeles Pushes Plans To Expand Port Facilities

Newest step in an over-all $101 million expansion program for the Port of Los Angeles was announced last week—a $15 million passenger and cargo terminal to be built by the Los Angeles Harbor Department, at San Pedro.

The new facility is to be built for assignment to American President Lines, and will take four years to complete. The work will include a two-story passenger cargo building, 1,059 ft by 200 ft, a cargo transit shed 630 ft x 200 ft, and dredging a slip 1,200 x 400 ft, and 35 ft deep at the side of the main channel. Additionally, two wharves with a total of 2,400 lin ft and 500,000 sq ft of paved area for parking and cargo handling are to be included in the project. The total facilities at the terminal will provide 35,000 tons of capacity.

Two-Dam Power Scheme Proposed in Northwest

Construction of two dams on the Sultan River to provide power and water for the Everett, Wash., area is proposed in an application for Federal Power Commission license filed by the Snohomish County Public Utility District. The project would develop 140,000 kw, at an estimated cost of more than $40 million.

The main dam, in Sultan Gorge on the west slope of the Cascade Mountains, would be a concrete arch structure 242 ft high and 320 ft long. It would provide 100,000 acre-ft of storage. A powerhouse at this site would develop 84,000 kw.

A rockfill dam, 190 ft high and 380 ft long, 3½ miles downstream, would be used to re-regulate the discharge from the first dam. Its powerhouse would have a generating capacity of 32,000 kw, while a third powerhouse below Lake Chaplain would have a 24,000 kw capacity.

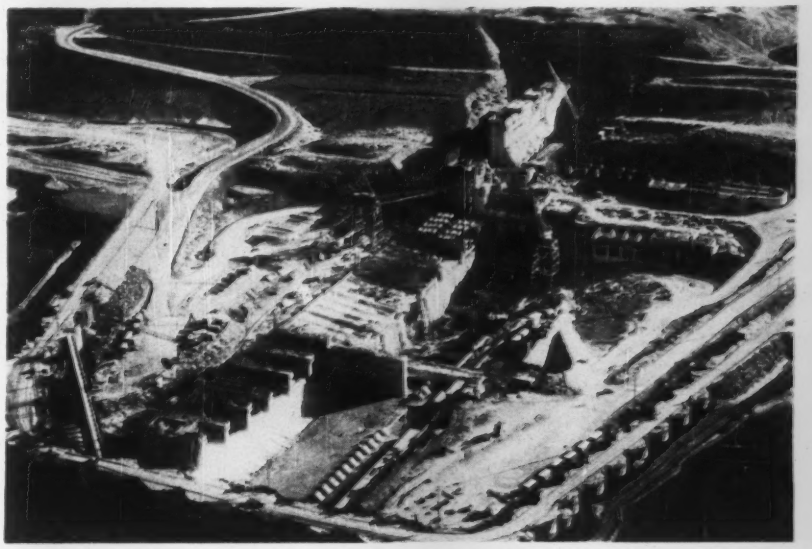
The project would also assure an abundant water supply for Everett and Snohomish County.

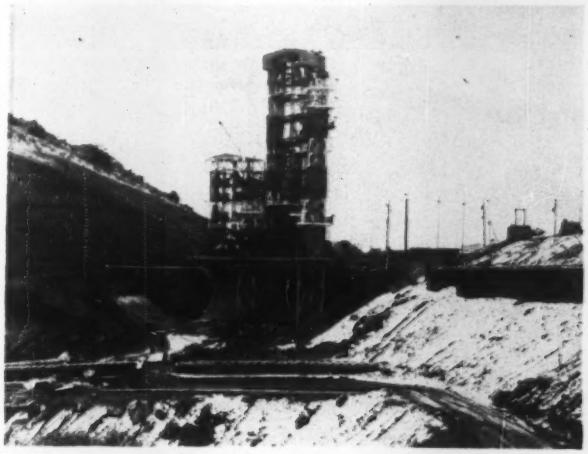
Planning for the project has been carried out by R. W. Beck & Associates of Seattle.

Ice Harbor Dam on Schedule

Aerial view of Stage 1 construction at Ice Harbor Dam on the lower Snake River in Washington shows progress on spillway and powerhouse areas. The $29.5 million Stage 1 contract includes (from lower left) spillway and stilling basin, powerhouse section of dam, fish ladder (normal to dam axis) and nonoverflow section of da mat left bank.

This work, by Montag, Halvorson, Austin & Associates, a joint venture of Pacific Northwest contractors, is now 45% complete. Ice Harbor's record setting 103 ft lift lock will be constructed on right bank of river within second stage cofferdam. Stage 2 bid call is expected in May.





Titan Test Base Unveiled

Huge captive-test stand for the Air Force's Titan intercontinental ballistic missile is nearly completed in first photos released of the Martin Co. missile test base near Denver. Under construction since February, 1956, by the George A. Fuller Co., New York City, under a $15 million contract, the facility incorporates other test fixtures, laboratories, and a complex of buildings for administration, engineering and manufacture. Additional Air Force outlay on the test area, tools and equipment totals $25 million.

World's Longest Fish Ladder

The long-way-round is the only way home for fish passing Portland General Electric's 204 ft-high Pelton Dam on the Deschutes River, in Oregon. Trout and other fish will swim up a fish ladder 2.7 miles long, which is thought to be the world's longest. The ladder is 10 ft wide with the steepest gradient being 1 in 16¼. Guy F. Atkinson Co., South San Francisco, is contractor on the $25 million project.

Jury Raps Design

Panel urges city to recover losses from architect

Architectural and structural design of a four-year-old Philadelphia building has been criticized by a special grand jury investigating deterioration of the structure.

In its final presentment, a special panel that since last May has been looking into the deterioration of a $3.4 million food-service building at the city-owned Philadelphia General Hospital has demanded that the city act to recover its losses from the architects. Completed in March, 1954, the building was found last year to have cracks in an outside wall and leaks in the tile roof. The condition came to light when the City Council was asked to spend $70,000 for repairs. The council appropriated the money.

The original architect, Eugene A. Stopper, died while the building was still under construction. He was succeeded by Gilboy, O'Malley & Clauss. The structural engineer was Axel Schultz. McCloskey & Co. was the general contractor.

The jury said full responsibility for faults in the construction of the building must rest on the original architect. It questioned spandrel details and omission of expansion joints in a concrete canopy. However, the panel found no evidence of criminal misconduct in the planning and building of the structure. There was no evidence of poor workmanship on the part of the building contractor, the jury stated.

In making its investigation the jury was aided by a 35 page report prepared by construction experts. The panel said its members were convinced that if the hospital building had been constructed for private industry, the owners would have been more careful in attending to the building deficiencies.

Rhode Island Intensifies Studies of Phenol Waste

With an oil refinery soon to be under construction on lower Narragansett Bay, Rhode Island state sanitary engineers have launched a study into the effectiveness of the hydrogenation process for disposing of phenol wastes. This process converts phenols into useful byproducts.

The state has loaned Hayse H. Black from the U. S. Public Health Service to study first hand the hydrogenation processes installed by Tidewater Oil Corp. at Delaware City and by Standard Oil Co. of California and Ohio in refineries in their respective areas.

The state also has procured the services of Victor Loosanoff, director of the U. S. Fish & Wildlife Service's marine laboratory at Milford, Conn., to determine what phenol concentrations will affect the palatability of shell and fin fish (USPHS standard allows 1 part per billion in drinking water).

Concern of Rhode Island officials stems from the $2 million a year Narragansett Bay fishing industry. W. J. Shea is state sanitary engineer.

Nashville Airport Gets Jet-Age Improvements

By 1959, Nashville plans to have a new jet-age airport after completing a $6.5 million improvement program at Berry Field that will provide a new terminal and runway.

The city council flashed the financial green light last week when it approved sale of $2 million in general obligation bonds as the city's share of the project. Federal and state agencies will foot the bill for the remaining $4.5 million.

The announcement ends five years of effort by the city's aviation commission to gain these improvements.

Bids will be opened January 8, and construction is scheduled for spring.

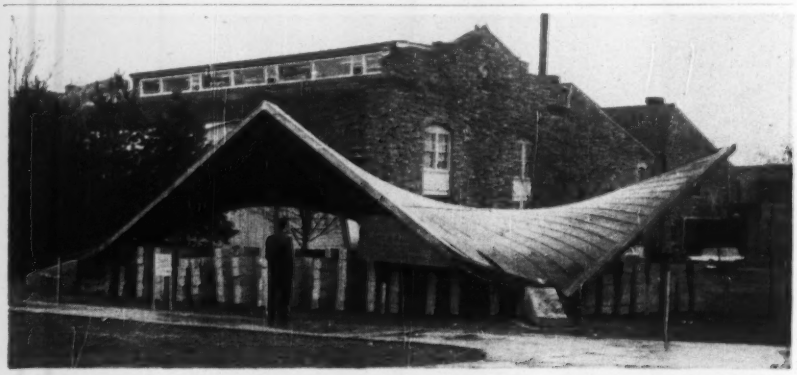
Bridge and Ferry System Bonds Sold in Washington

The Washington State Toll Bridge Authority voted to sell a $30.5 million bridge construction and ferry system improvements issue to the state's Finance Committee.

The action was taken after the issue failed to draw any bids from investment firms. A 4.75% interest rate and a provision for delayed delivery of bonds, which will trim interest costs by more than $1.5 million, were cited as the reasons for investor disinterest. Under the plan, bonds will be delivered in four blocks as construction funds are required.

The bridge, a floating unit, will be constructed across Hood Canal on the Olympic Peninsula. A four company joint venture group, headed by Morrison-Knudsen Co., submitted a low bid of $14.2 million for the floating and transition portions of the bridge.

The rather extensive ferry system improvement program will consist of modernization of three existing ferry terminals, widening of four ferries now in operation and the building of two new ferries.



FRACTURE OF EDGE BEAM of hyperbolic paraboloid ends experiment during which . . .

Plywood Roof Sustains Heavy Test Load

Full-scale load tests on a 20x40 ft plywood hyperbolic paraboloid built at the University of Kansas proved the strength of such thin-shell structures. Some danger areas were pointed out that can be compensated for by attention to design.

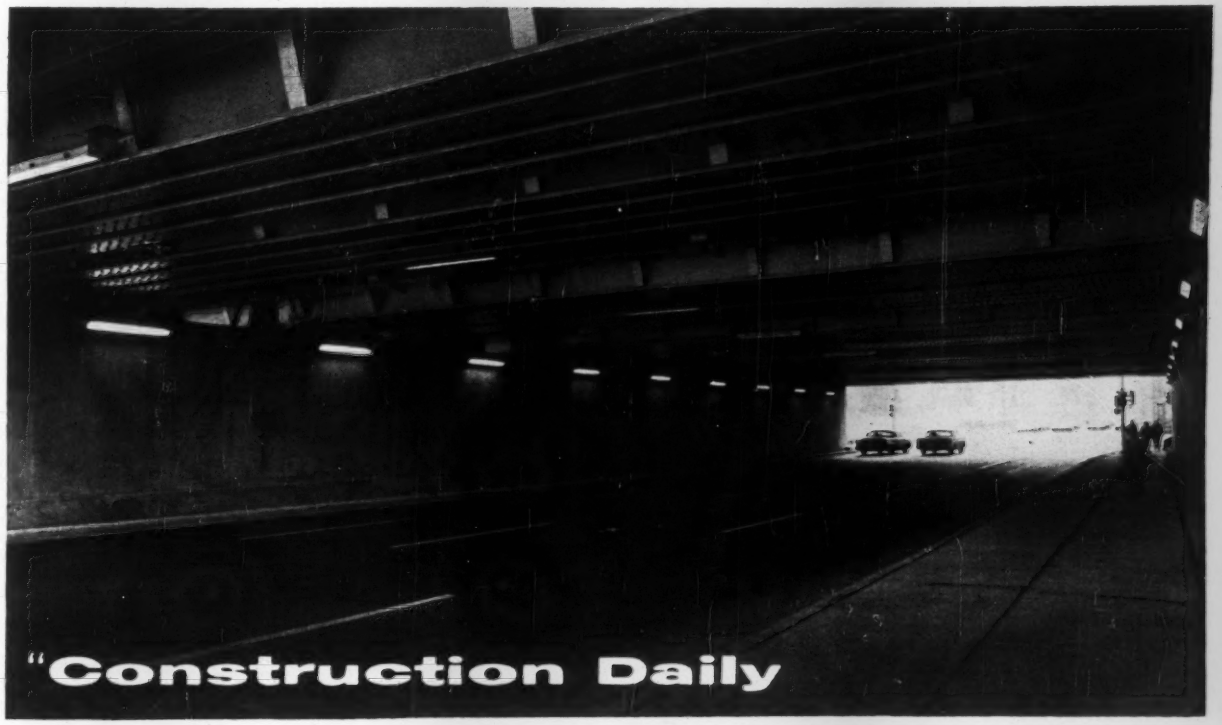
The shell is composed of two layers of ¼ in. plywood in 12 in. wide strips nailed and glued together. Edge members are composed of laminated plywood members.

The structure was constructed and permitted to weather over the winter before loading. Under uniform load, the paraboloid failed at 52 psf. Failure was due largely to fracture of the edge stiffeners.

The breaks could have been encouraged by slight movement of foundation abutments. This led Prof. Willard Strode, who supervised the tests, to conclude that edge members are likely to determine the ability of such a shell to sustain weight. And he also concluded that footings should be adequately designed against movement.

Tests also were conducted under concentrated load conditions with midspan of one panel loaded to 3,200 lb before removal of the load. Although no failure resulted in spite of a deflection of more than 11 in., indications were that the edge members might have failed before the shell.

The test program was conducted in cooperation with the Douglas Fir Plywood Association.



—VITALLY IMPORTANT IN OBTAINING NEW BUSINESS"

Says James McHugh Construction Co.

Reconstruction of Chicago's La Salle Street Station (photo), a job awarded the James McHugh Construction Company, cost $3,500,000. It's one of their many jobs — in the past few years this general contracting and engineering firm has handled more than $165,000,000 worth of building and other heavy construction.

Has Construction Daily helped get those contracts? Here's what the company itself has to say:

"Our operations are widespread and diversified and, consequently, we find Construction Daily an invaluable source of information on new projects of interest to us.

"We also find it helpful in keeping abreast of changing price data, material shortages and trends in various fields of construction, all of which are vitally important to us in obtaining new business."

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About this Company...

Founded in 1900, the James McHugh Construction Company was soon to expand into all types of public and private works. They have completed a variety of multi-million-dollar contracts for schools, public housing, hospitals, industrial buildings, sewage and water treatment plants.

Among these are Chicago's West-Southwest Sewage Treatment Works ($18.5 million), Dayton's St. Elizabeth Hospital ($2.3 million), the Tonawanda, N. Y., Water Treatment Plant ($2.6 million), University of Illinois Residence for Men ($1.3 million), Cleveland's Lake Shore Housing Project ($4.7 million), a brewery for Pabst Brewing Co. ($3.5 million), and many others.

James McHugh Construction Company headquarters are at 6449 South Park Ave., Chicago 37, Ill.

Big Sewerage System

Ottawa takes first step to build $43 million project

The city council of Ottawa, Ontario, has included $100,000 in the city's 1958 budget for engineering services for a $43 million sewerage system. This represents the first concrete move toward construction of the much needed and much talked about project.

Significantly, the action was taken only after the Ontario Water Resources Commisison had warned all communities in the province that the commission would grant no approvals for construction of sanitary sewers until treatment facilities exist or definite plans for treatment are submitted and approved.

Ottawa right now is in urgent need of additional sanitary sewers to serve rapidly expanding housing developments. Canada's capitol city is also the major offender among many cities on the Ottawa River, in both Quebec and Ontario, that discharge raw sewage into the stream.

The $43 million project being planned breaks down to $10.5 million for a sewage treatment plant and pump station, $14.9 million for an interceptor system, and $18.1 million for branch and lateral sewers.

James MacLaren & Associates, Toronto, has been retained as consultant on the treatment plant and DeLeuw, Cather, Ltd., (associated with the American firm of the same name) is engineer for the intercepting system.

New Sponsor May Seek License for Wells Dam

Washington Public Power Supply System may build the proposed $120 million Wells Dam on the Columbia.

Its 17 member public utility districts are being asked to approve a plan calling for withdrawal of the Douglas County PUD as sponsor of the project, in favor of the system. Douglas PUD holds a preliminary Federal Power Commission permit for the project but ran into trouble recently when Kaiser Aluminum & Chemical Corp., which financed preparation of preliminary plants, withdrew on the ground that the power would be too costly.

The 17-member PUD agency has applied for a preliminary permit on the proposed Ben Franklin Dam on the Columbia between McNary and Priest Rapids but probably would give priority to Wells Dam if present plans are brought to fruition.

The PUD plan would cancel a contract between the Puget Sound Power & Light Co. and the Douglas PUD, under which Puget Power would receive half of Wells' 400,000 kw.

News Briefs

• **Pollution control success**—A recent stock-taking of Pennsylvania's noted Clean Streams Program showed that in the 12 years the program has been under way, 131 sewage treatment plants have been built or placed under construction and at least an equal amount of progress has been made by industry. Former Sanitary Water Board Chairman Berwyn F. Mattison is satisfied, but not complacent, warning there is still a job to be done.

• **Hotel expansion**—Sheraton Corp. of America has called for bids from a selected list of contractors for an eight story, 300 room hotel in the $63 million Lloyd Center development at Portland, Ore. No cost is announced, but an application for a building permit gives an estimated value of $5 million. Bids are returnable January 6 and construction is tentatively scheduled for lates this month or early February.

• **Seattle office building**—A construction contract for an $11 million office building in Seattle soon will be awarded, according to the United Exchange Building Corp., owner. The 21 story structure will be Seattle's first air-conditioned office structure, and its first new large office building in 30 years. Prestressed, precast concrete floorbeams, 70 ft long, will be used, thus climinating interior columns in the building.

• **Luxury apartments**—Construction of a $12 million resident-owner apartment building in Los Angeles will begin next April 15. The new 22 story building, known as Beverly Tower, will be the tallest structure of its kind in southern California. It features glass walls, stainless steel spandrels, mosaic and marble exteriors. Pereira & Luckman are the architects.

• **Florida science center**—The University of Florida has received a grant of $75,000 from the Ford Foundation for the planning of a science and technology center. The funds will be used for a thorough study of how the physical sciences and engineering can be most effectively administered in a proposed new science center.

• **Restraint of trade**—Ohio Stone & Concrete Products Co., Amherst, Ohio, has filed suit in U. S. District Court, Cleveland, charging four competitors with restraint of trade under the Sherman Anti-Trust Act, the Clayton Act and Robinson-Patman Act. Defendants are Universal Sewer Pipe Corp., United States Concrete Pipe Co., American Vitrified Products Co. and Concrete Pipe Co. of Ohio, all Cleveland firms. In asking for $450,000 in triple damages, the plaintiff says that the four companies agreed to, a policy of fixing, controlling, stabilizing and maintaining of selling prices in the concrete pipe industry.

• **Cost of education**—A $250 million bond issue for building projects, of which 60% would be earmarked for higher education, has been proposed by Rep. George Sallade to help finance "a modern Republican program for modern Michigan." The proposal will be placed on the ballot next November.

• **Architectural scholarships**—The Architectural League of New York is accepting applications for its 1958 Brunner Scholarship, a cash award totaling up to $2,500. An applicant is to submit an outline of some project or study, which he is qualified to carry out, and which bears on the field of architecture, engineering, city planning or other related design fields. Further information may be obtained at the Architectural League, 115 E 40th St., New York 16, N. Y.

• **Cincinnati office building**—Construction has started on a 25 story, $10 million office building in Cincinnati. The structure will be known as the Kroger Building. It will be completely air conditioned and include a 400 car garage. Hedrick & Stanley, Fort Worth, Tex., are architects and engineers. George A. Fuller Co. of New York City is general contractor.

• **School electrically heated**—A completely electrically heated school has been planned for York, Pa. After balancing initial building costs against long term heating and maintenance expenses, school authorities decided in favor of the system. Buchart Associates, York, are architects and engineers.

• **Promising future**—Aluminum Co. of America predicts that by 1965 aluminum usage in home construction will total 1,000 lb as compared to only 30 lb today.

• **TVA expenditures** — Growing power needs of the Tennessee Valley will require the TVA to spend about $160 million yearly to provide new generating capacity, according to G. O. Wessenauer, manager for power. He said that from a power supply standpoint, the undeveloped hydroelectric resources of the river that are economically feasible of development have been virtually exhausted. "The new capacity which will be required each year must therefore come largely from fuel-fired generating plants," Mr. Wessenauer explained.

Another RAYMOND project completed

PHOTO BY FAIRCHILD AERIAL SURVEYS, INC.

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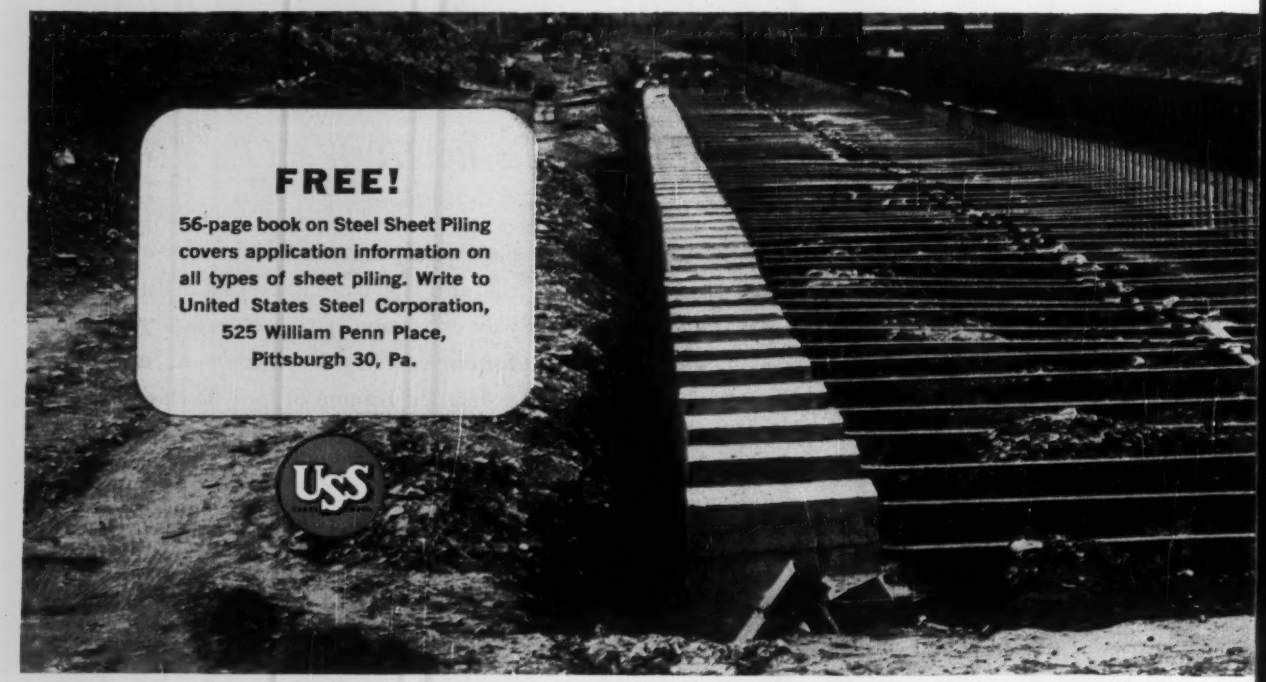
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USS

built tight and strong with USS Steel Sheet Piling

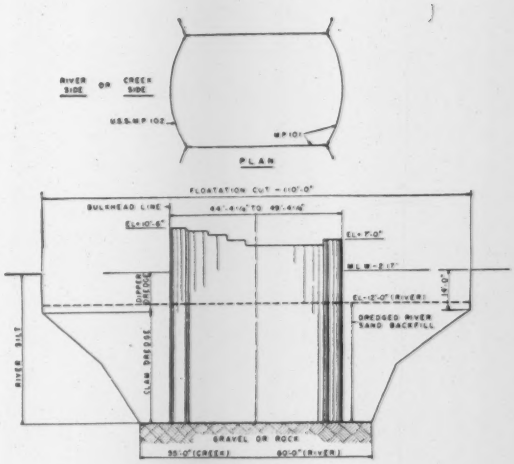
THE NEW EDDYSTONE STATION of the Philadelphia Electric Company will contain two 325,000-kw electric generating units. The No. 1 unit is designed for 5000 psi, 1200° F. steam conditions and will be the world's largest and most efficient turbo-generator. The No. 2 unit will operate at 3500 psi and 1050° F.

Construction involved a 900-foot cellular wharf along the Delaware River and a 1400-foot bulkhead wall along Crum Creek. The cellular wharf required 1932 straight web piles for the first 800 feet. Silt was excavated to gravel strata (on rock) for a trough 10 feet wider than cells at base, and the trough was backfilled with river sand prior to driving.

The bulkhead was built with 1004 Z-type piles. Driving was tough. Numerous boulders in the gravel strata required extensive jetting during driving. Piles were 30 to 60 feet long and were driven to rock.

When you need any type of piling—straight web, arch web or Z-type sheet piling, or H-beam bearing piling—get in touch with the United States Steel office near you.

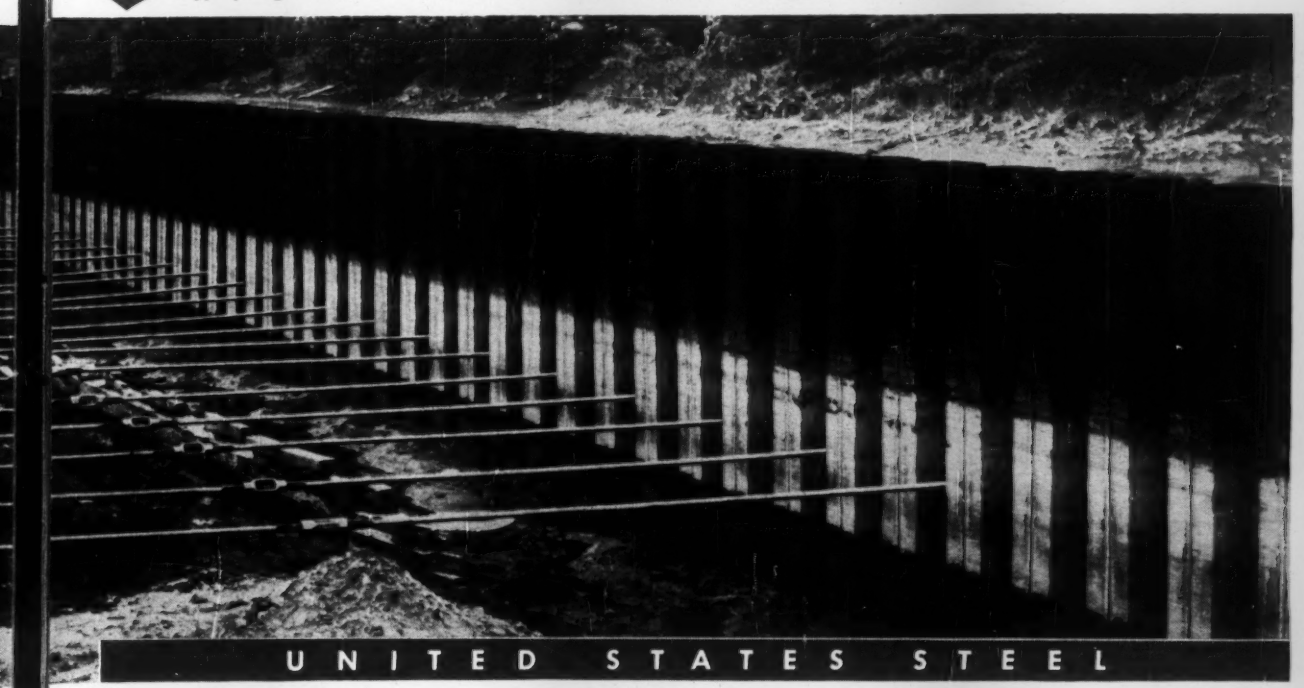
The general contractor for the Eddystone Station job is United Engineers & Constructors, Inc.; pile-driving contractor: Thomas Earle & Sons.



Cellular wharf construction using standard USS MP-101 or MP-102 piling with "Y" piece in the corners.

United States Steel Corporation, Pittsburgh, Pa.
Columbia-Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Export Company, New York

Z-type piling used for permanent bulkhead wall for maximum beam strength and economy.



UNITED STATES STEEL

Favorable fill material is aiding fast construction schedule for 512 ft Swift Dam, a 15 million cu yd earthfill.

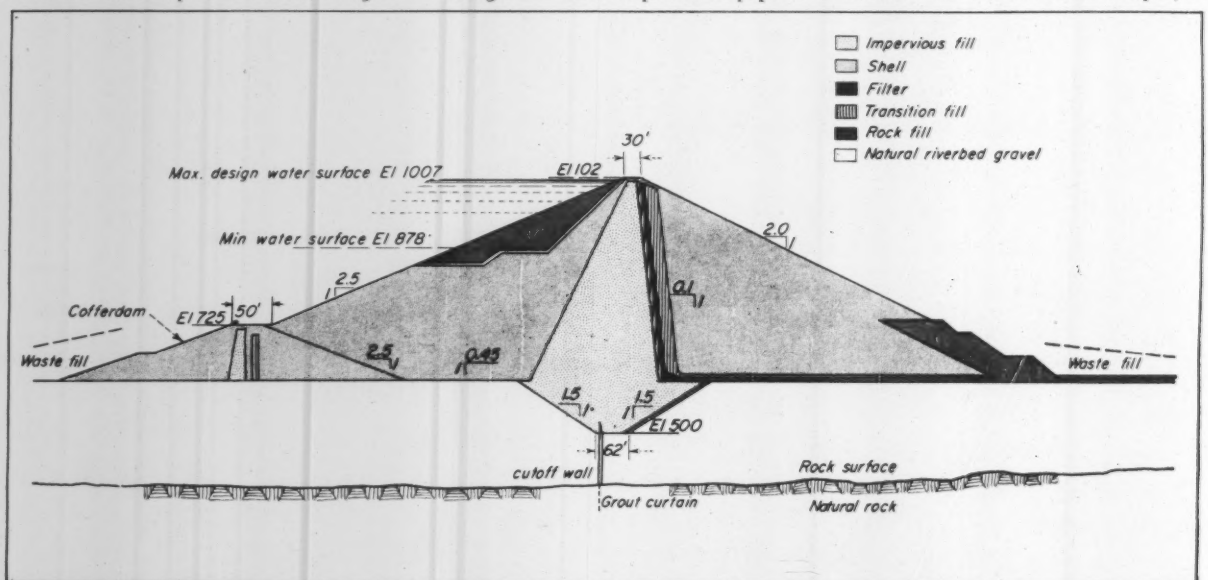
World's Highest Earthfill Dam Is a

From start of construction to first power generation in 30 months is the schedule set up for 512 ft high Swift Dam—highest earthfill construction men have yet undertaken. And with first power due in November, 1958, that ambitious program is still on schedule, placement of fill having recently passed the halfway mark.

To build a 15 million cu yd fill in such a short time is difficult. It is possible only because of close coordination of efforts on the part of owner, designers and contractors. And easing the difficulty somewhat on Swift Dam is the favorable fill material involved—a fine grained sedimentary conglomerate with practically no plasticity. It can be worked in wet weather.

Swift is the third major structure built by Pacific Power & Light Co. on the Lewis River in southern Washington (see box). It will have 204,000 kw installed nameplate capacity capable of peaking at 250,000 kw.

Being built under a partnership plan in conjunction with the dam and its power plant is an afterbay powerhouse with 70,000 kw capacity called Swift Powerhouse No. 2. A 3½ mile canal connects the discharge of the powerhouse at the dam with the intake of the afterbay unit. The latter is being built for a public agency—Cowlitz County Public Utility District of the State of Washington. Design of the entire project for PP&L and Cowlitz PUD is being handled by Bechtel Corp. of San Francisco. Cost for the entire project



HIGHEST EARTHFILL DAM requires 15.3 million cu yd of material. Fill in main shell is nearly as impervious as central core. Thus, an effective downstream filter is a necessity. Rockfill in upstream drawdown area prevents sloughing.

EXCAVATION of fine grained sedimentary conglomerate with little plasticity employs power shovels and belly dump trucks.

FILL IS DUMPED in the embankment after short 1½ mile haul from borrow area.

30 Month Job

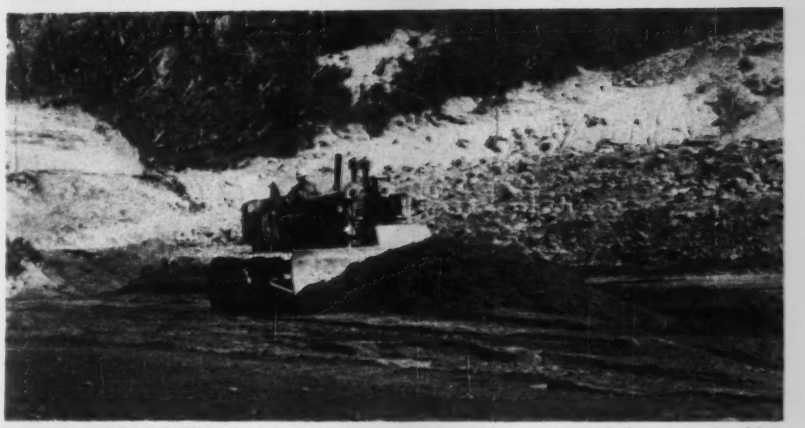
(both Swift No. 1 and No. 2) is pegged at $70 million.

The Lewis River has its greatest flows in the wintertime, being fed by heavy rains that are on the order of 120 in. a year. Mountain peaks that are snow-capped the year around do provide substantial summer flow, but the greatest value of power installations on the Lewis River is in providing peak generation in the winter months. That's the time when the load is greatest and the time when the flow in the Columbia River is the smallest; the huge federal projects such as Bonneville, The Dalles and McNary are not at their generating peak in the wintertime.

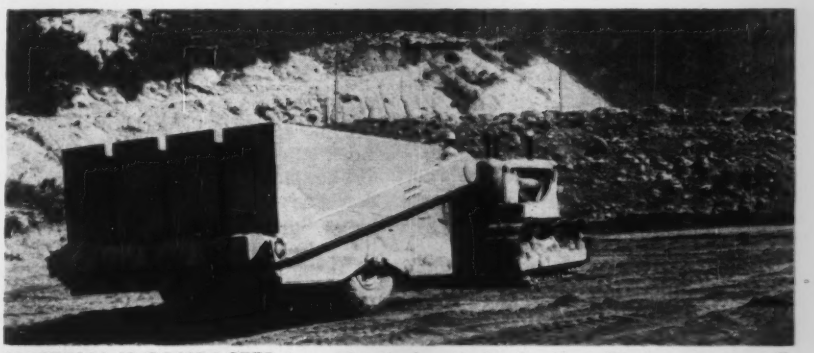
• **Construction schedule**—Once PP&L officials decided to go ahead on the Swift project, they wanted it built swiftly and as economically possible.

To accomplish the speed objective, work was let to contract as rapidly as plans could be developed. First construction began in May, 1956, and involved excavation of the diversion tunnel. This 2,990 ft long, 32 ft dia bore carries river flows around the left abutment. Contractor on the tunnel with a $1.8 million contract was Guy F. Atkinson Co., Inc. The Atkinson work also included construction of the upstream cofferdam using tunnel waste and material from cutoff excavation. And some tunnel excavation was stockpiled for later use in the downstream toe of the dam.

While the tunnel work was going on, detailed plans were developed for the dam proper. This was bid in October, 1956, with the contract going to a joint venture of J. A. Jones Construction Co., Charlotte, N. C., and Chas. H. Tompkins Co., Washington, D. C., for $18.3 million. The Jones-Tompkins contract includes the dam, spillway and power tunnels. Award of the dam contract in the fall of 1956 permitted the contractor to prepare his detailed construction program and assemble equipment for start of work early in the 1957 construction season.

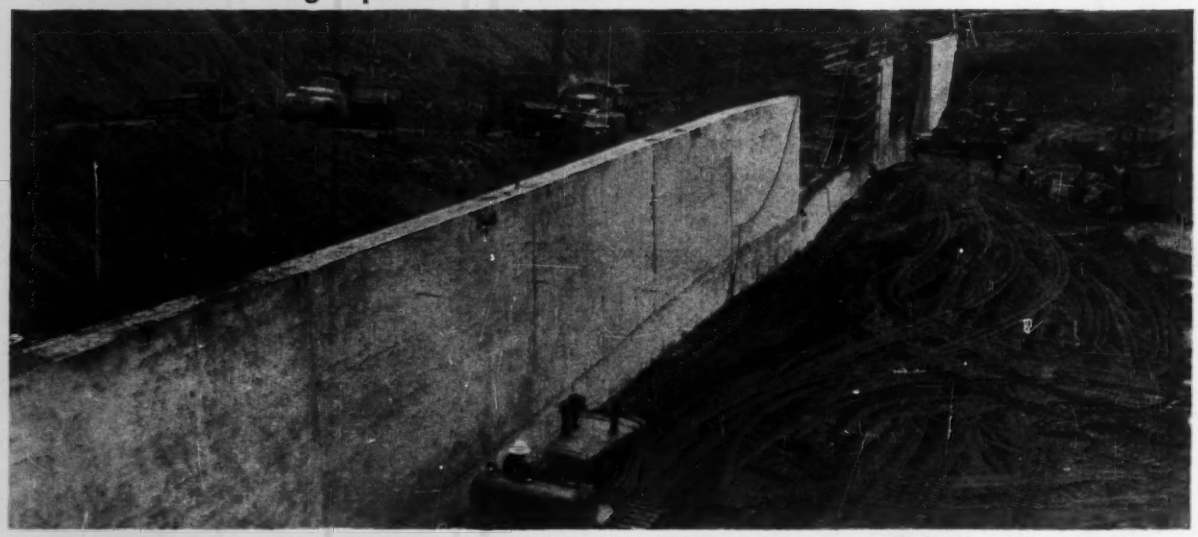


DOZER SPREADS FILL to 15 in. thickness. Granular material includes some boulders. It can be worked in wet weather.



MATERIAL IS COMPACTED by rubber-tired, articulated roller. Four passes generally are sufficient for compaction.

Swift Dam: Interlocking H-piles form cellular cutoff wall



CONCRETE CUTOFF WALL, 30 ft high, tops 90 ft deep steel pile curtain that includes concrete-filled cells.

Meanwhile, Bechtel Corp. continued work on preparation of plans for the two powerhouses. These projects were bid in the spring of 1957 with award going for both units to Guy F. Atkinson Co., Inc. Powerhouse No. 1 is a $2.5 million job and Powerhouse No. 2 with its connecting canal is a $7.3 million job. In addition to the structural work at the two powerhouses, these contracts include 3 million cu yd of embankment for the canal.

Thus work was expedited by awarding major elements of the construction as soon as plans had been developed. In the meantime, of course, purchase orders for turbines and generators had been placed. And work was started on relocation of 13 miles of road around the project area.

ROCK EXCAVATION is required on spillway and forebay excavation on left bank of the dam. Spillway has 120,000 cfs capacity controlled by two gates.

• **Dam details**—The dam is 412 ft in height from original streambed level to crest. A cutoff trench excavated 100 ft into streambed materials makes total structural height 512 ft.

Actually, the underlying materials were not excavated completely to bedrock. Some 90 ft of riverbed gravels between bottom of the cutoff trench and bedrock are sealed by a unique cellular steel pile underground wall. The 300 ft long curtain is composed of interlocking H-piles with cells pumped out and filled with concrete (ENR Mar. 21, p. 94). The wall is topped by a tapered 30 ft high concrete cutoff wall. In addition to the steel pile cellular construction, the foundation of the dam is grouted for its full length.

Axis of the dam is curved upstream on a 4,600 ft radius. Crest length is 2,100 ft and base thickness is 1,950 ft.

The dam has a side channel spillway excavated into rock on the left abutment. The 1,750 ft long channel has a 120,000 cfs capacity controlled by two radial gates.

The spillway upstream from the gates also serves as powerhouse forebay. The power tunnel inlet is located just below the gate structure. The 1,575 ft long, 25 ft dia tunnel has a 65 deg bend to lead from just beneath the spillway to the powerhouse. It branches into three 13 ft dia penstocks at the powerhouse.

The powerhouse is equipped with three Francis turbines rated at 107,000 hp each, when operated at 378 ft net head. The turbines drive generators with name plate ratings of 68,000 kw.

• **Dam design**—Design of Swift Dam is facilitated by the abundance of the natural sedimentary conglomerate material in the area. This fine grained material makes excellent core material which when compacted has a permeability K factor of about 10^{-5} cm per sec.

Because the natural material has no plasticity, it can be placed in all but the wettest weather. This, of course, is a big factor in the fast time schedule particularly where rainfall exceeds 120 in. annually. Construction work on other earthfills in the Pacific Northwest where clay has been used for the impervious core has been restricted to three or four months a year.

At Swift some clay materials resulting from spillway excavations are used in the shell. Some of the clays are unsuitable even for shell use and are wasted.

The sedimentary borrow material is

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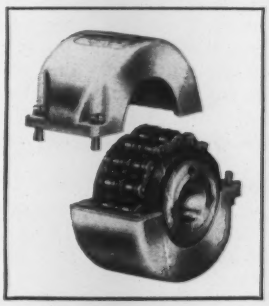

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Swift Dam: Filler zones are controversial

PENSTOCK TUNNELS are steel lined to 13 ft dia. Tunnel at left was dug larger to facilitate moving steel junction sections into the tunnel.

available in such large quantity as compared with rock, that it also is used for a large portion of the dam's shell. The only difference between core and shell requirements is that at least 12% of the material going into the core must be finer than a 200 mesh screen. Fortunately, substantial portions of the borrow pits contain rock flour in about that percentage.

Both core and shell are placed and compacted in the same manner—spread in 15 in. layers and compacted to 12 in. thickness. The fact that core and shell materials are so similar presents distinct design problems. Steps must be taken to prevent the entire mass of the dam from becoming saturated. This is accomplished by placing a filter zone just downstream from the central core so that water seeping through will be drained off. Thus, the downstream shell will be kept dry and not subject to sloughing. This permits the downstream slope to be kept at two horizontal on one vertical which is relatively steep for earthfills.

• **Filter zone needed**—Filter zones have been used in many earthfills, but some designers seem opposed to their use. The Bureau of Reclamation, for example, seems opposed to use of filters. Such large USBR earthfills as Davis (ENR Aug. 22, 1946, p. 84), Anderson Ranch (ENR Sept. 18, 1947, p. 96), Palisades (ENR Dec. 31, 1953, p. 28) and Trinity (construction just getting under way) Dams do not have filters. Instead they have semi-pervious and pervious zones as shells for the core. Specifications control the nature of the shell material to prevent saturation of the downstream slope.

The filter at Swift is nearly vertical, being inclined slightly upstream. Actually, there seems to be no good reason why the filter could not be vertical or even inclined downstream. And, for that matter, the slopes of the central core could be varied substantially. The governing condition is thickness of core and slope of the shell.

Main part of the filter is a central drain of 12 ft width. Material for this is processed in an aggregate plant and is restricted to rock sizes that will provide a free draining filter and that also will prevent migration of transition zone materials into the filter. Naturally, these two requirements lead to close control of gradation. In larger rock sizes, from 62 to 100% must pass a 3 in. screen and from 25 to 75% must pass a ¾ in. screen. These requirements substantially guarantee a free draining material. But to prevent migration of other materials into the filter, not less than 15% of the material must pass a ¼ in. screen and not less than 8% must pass a ⅜ in. screen. Now if all the fine grained material is in the very small range, the filter might not function as a filter. Thus, the smaller sieve sizes are restricted as follows: No. 4 screen—0 to 40% passing, No. 8 screen—0 to 30% passing, No. 30 screen—0 to 10% passing, and No. 50 screen—0 to 2% passing.

On each side of this drain are transition zones to prevent piping through the tight core and shell into the drain. The transition zone is composed of natural stream bed deposits that are well graded sands and gravels. The fine grain sizes are limited to not more than 5% passing a 200 mesh screen.

An 8 ft thick rock blanket is laid on the natural riverbed materials under the downstream shell to act as a continuation of the filter and, in effect, a horizontal drain.

Upstream slope must be protected from sloughing due to pressure of entrapped water resulting from drawdown. Thus, a substantial section of the upper part of the upstream slope is rockfill, which will be sluiced in 25 ft layers.

• **Construction operations**—Construction of the huge earthfill is entirely a truck-and-shovel operation. And due to the relatively tight time schedule, high production rates must be maintained. After full production was established, the schedule called for 48,000 cu yd a day (6 day week). This has been substantially exceeded with several days resulting in more than 60,000 cu yd of material placed in the embankment.

Due to the work on the cutoff wall, full fill production could not be reached until about the middle of the year. July was the first month where fill exceeded 1 million cu yd. That figure also was exceeded in each of the following three months.

During the worst of the winter months—December, January and February—the contractor hopes to place 500,000 cu yd a month. The schedule calls for all fill to be in place by Oct. 31, 1958. Thus, with diversion tunnel scheduled to be plugged in October, the powerhouse will be ready for first generation in November.

These fill rates are accomplished by 10 power shovels and draglines feeding a fleet of more than 50 end-dump and bottom-dump trucks. The end-dump trucks are 15 cu yd capacity and the bottom-dump trucks are 20 and 25 cu yd capacity. The digging rigs range in size from a 1½ cu yd shovel to a 7 cu yd dragline. Most units are from 2½ to 4 cu yd shovels.

The largest shovel has a 6 cu yd bucket. Production from this unit averages better than 600 cu yd an hour. And, on the basis of two 10 hour shifts, rates as high as 7,500 cu yd per shift are not uncommon.

Most of the fill comes from a borrow area about a mile and a half from the dam site on the banks of Swift Creek. In this area shovels work against a vertical cut face of 15 to 25 ft height. The sedimentary material is deposited in layers. By working against a fairly high vertical face, the shovels automatically blend the material as they excavate it.

The borrow includes some boulders. Largest are removed in the borrow area. Smaller boulders are literally hand-picked out of the fill and taken to rockfill areas. The desirability of blending fill material in the borrow area and the presence of boulders ruled out the use of elevating loaders for excavation.

The fill is compacted by articulated rubber-tired 50 ton rollers. Four passes give the necessary compaction.

Material for the filter is brought in by end dump truck and spread by a small tractor with a winged bulldozer blade slightly less than the required 12 ft width. This filter zone is kept a foot or two higher than the rest of the fill to preserve its integrity.

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Swift Dam: Sealina a lava-bottomed canal

SURGE TANK EXCAVATION is handled by crane and bucket. Chamber excavation is 59 ft in diameter and 163 ft deep. Steel surge shaft will be 55 ft dia and 193 ft. deep.

the penstocks and downstream end of the power tunnel as well as installation of steel liner in the penstocks, work began early this fall on the powerhouse proper. Whirley cranes are being installed at both Powerhouse No. 1 and Powerhouse No. 2 to service the work.

Powerhouse No. 2 is located on a sand-and-gravel foundation 56 ft below the level of the lake formed by Yale Dam just downstream. The contractor will leave a plug in the tailrace channel until the powerhouse construction is above lake level. To reach the foundation level means drilling through a 25 ft lava flow layer. A well point installation is being used to keep the powerhouse excavation dry.

Other Lewis River dams

Swift Dam, with its two powerhouses, is the third major installation on the Lewis River. First unit was Merwin Dam and powerhouse. This is a 313 ft high concrete gravity-arch dam completed in 1931, with present peaking capacity of 100,000 kw. Construction of the Swift Project firms up storage to permit addition of a third 50,000 kw generator at Merwin to be ready for service in the summer of 1958.

Just upstream from Merwin is Yale Dam, completed in 1953 (ENR Aug. 7, p 49). This 323 ft high earthfill has a 133,000 kw peaking capacity.

Pacific Power & Light has applied for a Federal Power Commission license for a fourth Lewis River project—the 110,000 kw Muddy project upstream from Swift. Muddy is estimated to cost $34 million. Studies also are under way under an FPC preliminary permit for a fifth development above Muddy; this would be the Meadows hydroelectric project, which may produce 100,000 kw from four Lewis River tributaries.

This lava also underlays 172,000 sq yd of the lower portion of the tailrace canal. Sealing it was a problem. The contractor first burned off all exposed moss. Then he sluiced the lava with sand and gravel to fill the voids and sealed the canal bottom with a 4 ft blanket of very silty sand.

Another major operation in connection with the project is relocation of 13 miles of public and private road that passes through the reservoir area. This is being handled on an equipment rental basis by Kuckenberg Construction Co. and J. N. Conley with engineering by Pettijohn Engineering Co.

The relocation work is being rushed to completion as traffic must pass through the embankment area until the relocated road is opened.

• **Engineers, constructors**—Heading up the work for Pacific Power & Light is E. Robert deLuccia, vice president and chief engineer. Coordinating the program is Frank L. Beadle.

Designing the work and supervising construction is Bechtel Corp. Engineering is under the direction of M. L. Dickinson, chief hydraulic engineer, with J. G. Patrick as project engineer. Construction management is directed by Earl E. Nichols. Assisting Bechtel in the design is an impressive list of engineering, construction and geologic consultants including I. C. Steele, Julian Hinds, Arthur Casagrande, A. H. Avers, Roger Rhoades, Portland P. Fox.

For the Jones-Tompkins joint venture, Paul H. Swanson is project manager and W. H. Kennish is general superintendent. For Guy F. Atkinson Co., George McCoy is project manager.

The Jones-Tompkins joint venture has subcontracted the power tunnel, penstock and surge tank excavation to A. J. Cheff.

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EMULSIFIED ASPHALT *PLANTS AND PROCESSES*

Putting a trunk sewer across a

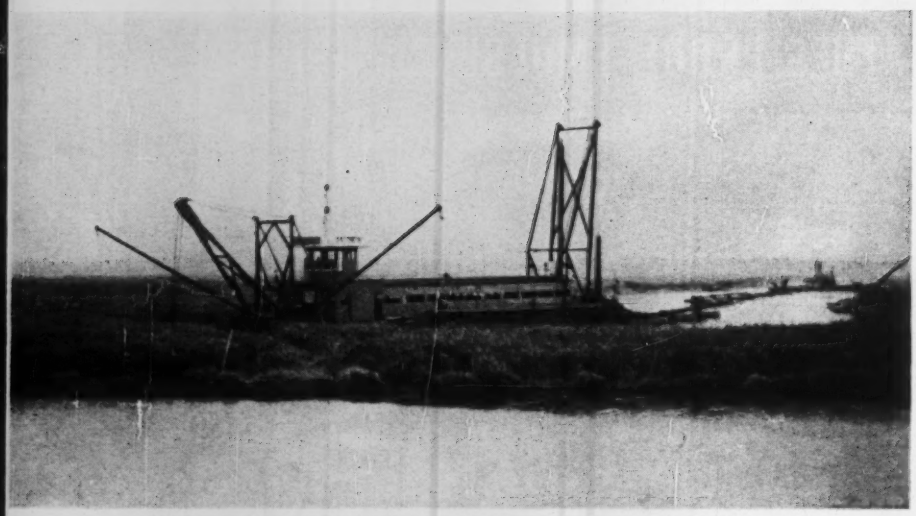
Dredge Makes

The problem was to lay an 84 in. reinforced concrete pipeline across a 4,500 ft wide tidal swamp as part of a main trunk sewer. The bid plan called for a pile support method, but a second look by the contractor caused him to change his mind and obtain permission to do it differently.

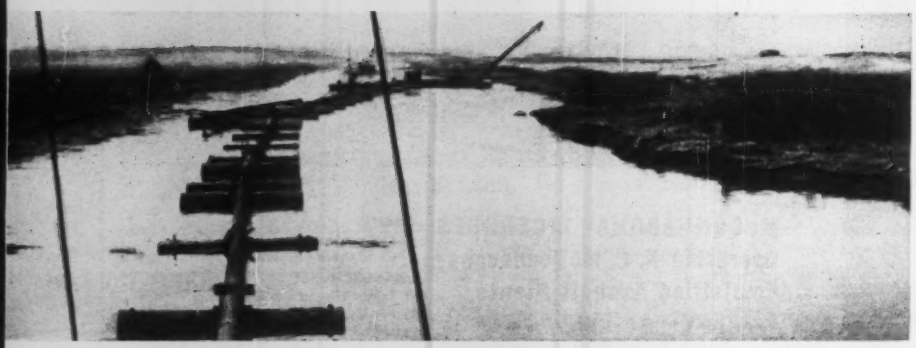
What he did was to bring in a shallow-draft hydraulic dredge to strip the thick overlying mat of muck along the pipe's centerline, then backfill the excavation with sand to make a solid work area across the swamp.

Two of the big benefits: Nearly a year chopped from the schedule and over $1 million saved for the owner, The Middlesex (N. J.) County Sewerage Authority. The line in question is one part of the authority's $27 million cleanup program of the lower end of New Jersey's Raritan River. The swamp-crossing section is at South River, N. J., and is under contract to Verona Construction Co., Verona, N. J.

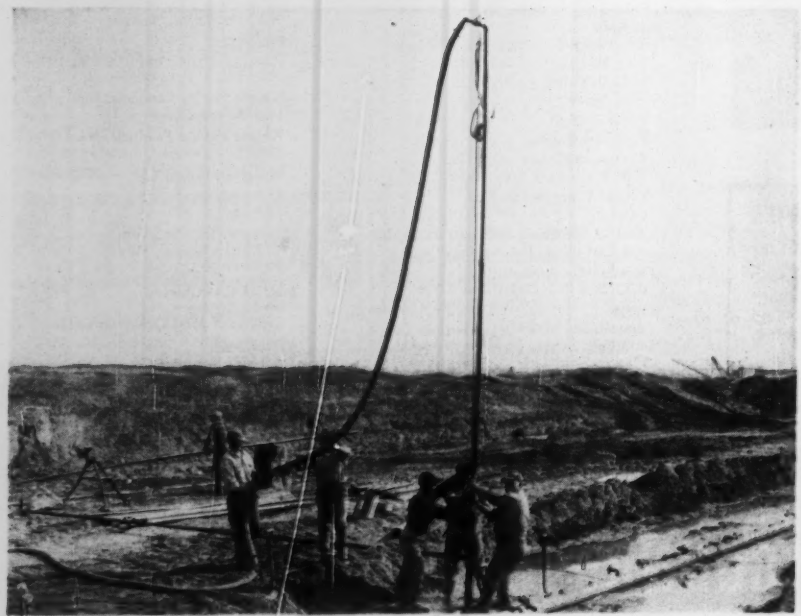
• **Muck out, sand in**—First step for Verona was to sub the dredging to Missouri Valley Dredging Co. of Omaha, Neb., which had just completed work on Long Island with its



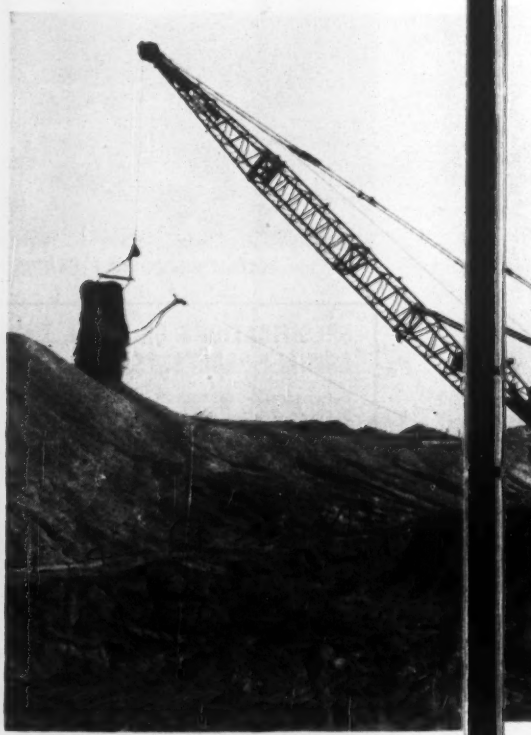
Dredge cuts trough through swamp, sending material along . . .



. . . floating discharge pipe to diked spoil areas.



AFTER SAND IS DEPOSITED in trough by same dredge, and bulldozer has pushed up dikes to protect against 5 ft tide, wellpoints are put in to drain area.



TRENCH IS STARTED by dragline working between wellpoints and casting sand up

4,500 ft swamp—

Land for Pipelaying Project

dredge, the Baldwin. This 18 in. cutterhead hydraulic dredge, with its 3½ ft draft, had been built to operate in the swamps and marshes of the New York metropolitan area, and was thus well suited for its new job.

The Baldwin was moved into the South River area from a shallow river bisecting the swamp. It first proceeded north to one bank of the swamp and then turned and plowed through to the opposite bank. The dredge worked out a trough 200 ft wide at top and 100 ft at the bottom, dealing with 15 to 25 ft of muck that overlay a stable foundation of clay and sand.

The dredge worked around the clock, pumping about 5,000 cu yd of material a day into large diked spoil areas in the swamp along the trough. The dredged material was carried through an 18 in. floating discharge line to a derrick-equipped spilling barge which suspended the line over the spoil areas. The barge moved along behind the dredge, eliminating the need for constant changing of the discharge line.

When the dredging was completed, the Baldwin, drawing from an adjacent borrow pit under the swamp, started to backfill the trough with sand. The sand was placed under water to aid in effective compaction. Tests showed that a 90 to 95% compaction was achieved. To place the sand, a discharge line up to 2,750 ft long was used, with the floating section of the line made up of 40 ft lengths mounted on pontoons and connected by a quickly made ball and socket joints. Some sand was hauled by truck.

• **Sand out, pipe in**—As soon as enough backfill was in place, the pipelaying equipment and crew moved in. The job still was by no means simple since the flow line of the pipe was about 20 ft below the grade of the swamp, which in stretches would bring the pipe down almost to the bottom of the sand backfill.

The sequence of pipelaying operations—which achieved 140 ft of pipe laid in a day—went as follows:

First, a bulldozer worked right behind the discharging end of the dredge pipe, cutting a trough through the center of the fill and pushing up dikes to protect the job against a 5 ft tide.

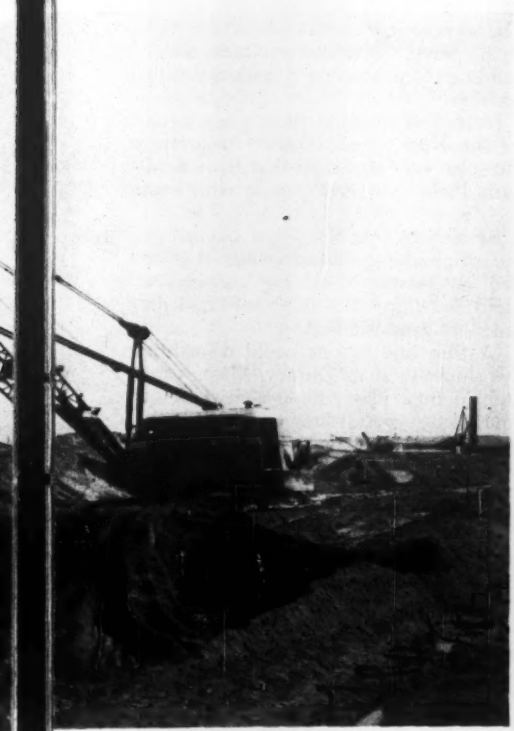
Following the bulldozer, a crew of men advanced two lines of wellpoints, one on each side of the trench. Each line ran 1,000 ft long and consisted of 25 ft deep points placed 4 to 6 ft apart. Eight-inch-deep holes were jetted and backfilled with coarse sand for the points, greatly increasing their efficiency. Then, with two 8 in. pumps operating, the water table was lowered about 22 ft, providing a good dry area for working.

Next, a dragline was used to take out another 5 ft of sand between the lines of wellpoints. This sand was cast directly up onto the sides of the deepening trough.

Finally, the remaining 12 ft of what became a 20 ft deep trench was removed by a backhoe. The backhoe worked along the centerline of the pipe, taking the sand, making a 180 deg turn and depositing it on the fill. From there a dragline recast the sand onto the dikes.

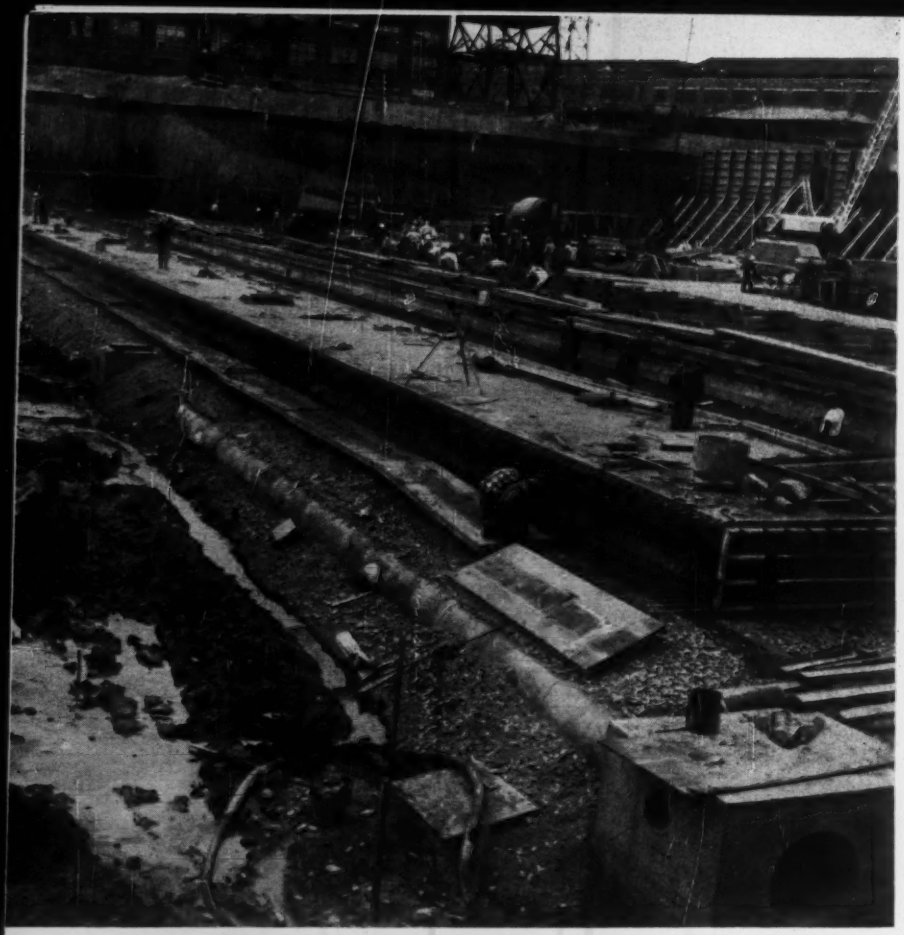
When enough trench had been excavated for a length of pipe, a small clamshell placed a 1 ft thick bed of crushed stone in the trench bottom. A 16 ft length of concrete pipe was then lowered into place and a joint made. The last step was backfilling the laid section by a bulldozer pushing back the sand that had been cast on the dikes.

Superintendent for Verona was Vincent Cestone and for the dredging company, Raymond Henry. Howard Patton represented C. J. Kupper, engineer on this phase of the project.



onto dikes. Dragline works about 5 ft of sand, leaving the next 12 ft for a backhoe.

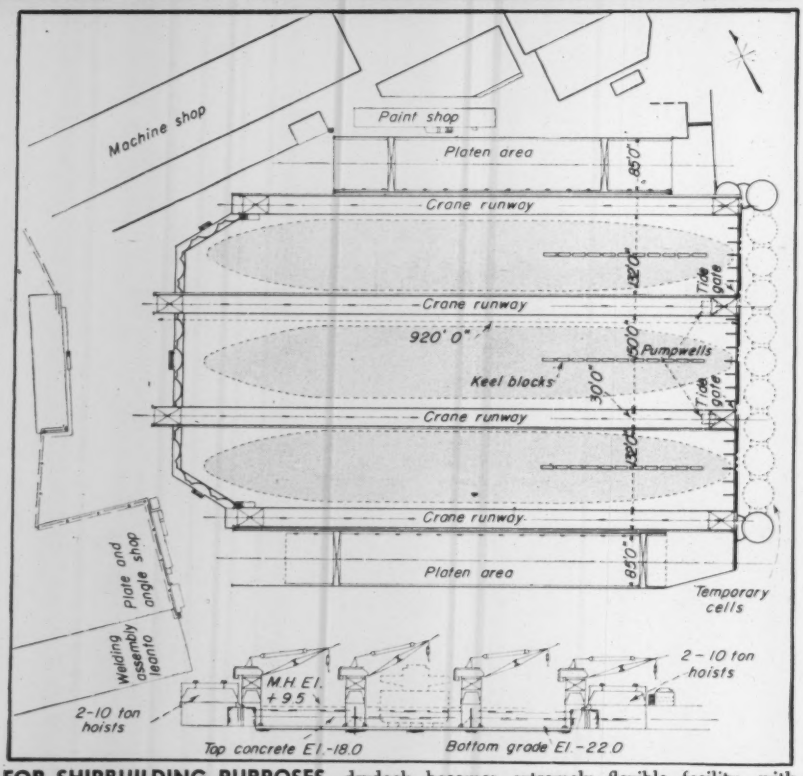
PIPE GOES IN prepared bed as backhoe digs trench in fill where dragline left off. Backhoe casts sand behind itself, then a dragline recasts the sand onto dikes.



EVERY STEP in drydock construction is visible here—from dredged bottom, through inverted drain and porous pipe, to 4 ft-thick slab, to steel dividing walls (upper right).

Supertankers and an atomic-powered cruiser are too long to be built on inclined shipways. Answer is to build a super-graving dock, so ships can be constructed with level keels . . .

Three-Section



FOR SHIPBUILDING PURPOSES, drydock becomes extremely flexible facility, with easy access from service areas.

To meet the challenge posed by demand for huge new oil tankers and a nuclear-powered surface vessel for the U.S. Navy, Bethlehem Steel Shipbuilding Corp. a year ago made a daring decision:

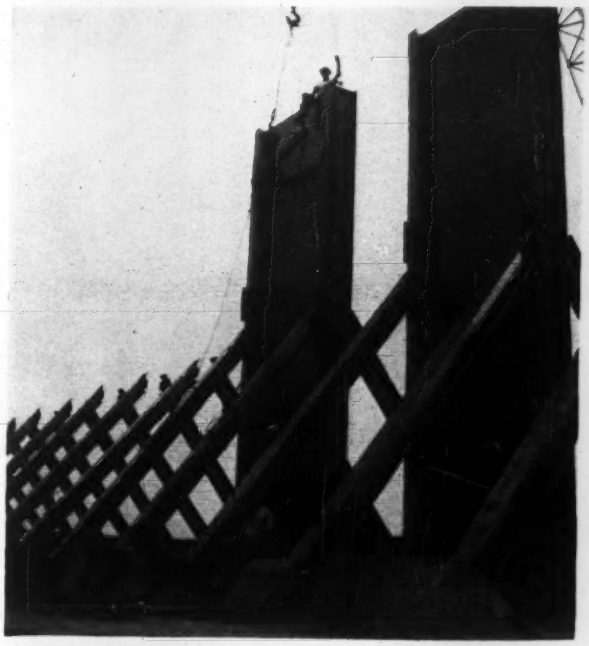
Instead of building these great ships on the conventional sloping shipways, the company decided that it would build them in a graving dock with their keels level.

Bethlehem's problem—not unusual in the shipbuilding industry—was that it had no graving dock big enough to build the ships that it already had on order. It gambled that:

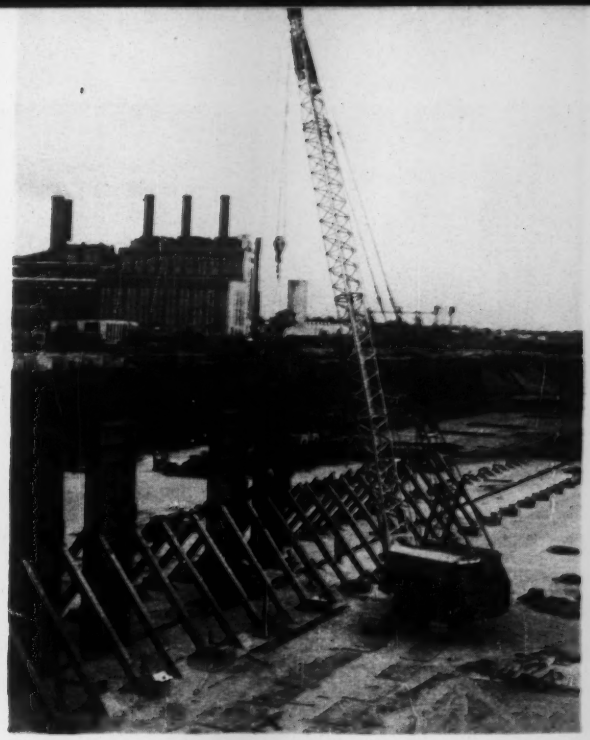
Within one year it could dismantle five shipways at its Quincy, Mass., yard and, in their place, build a drydock of colossal size—900 ft long by 500 ft wide. It was estimated that the dock could be ready for the first keel laying by Jan. 1, 1958.

The job is being done. In fact, on Dec. 2 the keel was put down for the U.S.' first nuclear-powered surface ship, the Navy cruiser Long Beach.

And the performance has included a number of major innovations in drydock construction, one of which is worthy of attention alone. This is the fact that the total basin will be divided into three compartments, each of which will be a separate drydock capable of being filled or dewatered in-



WALLS that will convert one big basin into three are steel sheets, prefabricated and dropped into place by crane.



FULL SIZE of basin dwarfs men and equipment working in it. Sheetpile cells will remain as permanent sidewalls.

Graving Dock Designed and Built As One

dependently of the other two. The dividing walls between these sections will be made of steel.

The decision to use steel was predicated on two counts; first, that walls could be fabricated by the shipbuilding company's parent organization while general construction of the dock went ahead; second, it has offered advantages in economy of construction.

Mounted over and around these steel dividers will be superstructures that will house necessary offices and working facilities for the shipbuilders; atop them will ride the enormous traveling gantry cranes that are part of the shipbuilding operation.

And the shipbuilding company—and its design engineers, Foster & Cafarelli, consulting engineers of New York City—figured to use the 9½ ft tide of the area to advantage to fill the dock without pumping, and to take more than a third of its water content out before pumping is necessary.

• **Shipbuilding problem** – Generally, ships of the tanker and freighter classes are built on shipways, usually nothing more than huge pads of concrete built on an incline so that the finished vessel can slide into the water when the builders have completed the hull and sometimes the superstructure.

Shipways present a number of problems for the builders—problems that increase directly in proportion to the length and weight of the vessel being constructed.

For example, the ship's keel on a shipway must be exactly aligned so that all parts of the vessel are in proper relationship with each other, despite the inclination on which the ship is being built. This often involves minute calculations by carpenters and others, relating each portion of the keel to the preceding and succeeding portions.

In addition, the inclination of a shipway requires considerable timber structure to support the hull of the vessel as it is being built up from the keel. Further, the height of the vessel being built is limited by the height of the gantries that serve such shipways.

Faced with the problem of constructing some of the 70,000-80,000 ton super-tankers now on the drawing boards—vessels that will be nearly 900 ft long and as much as 100 ft in height to the top of the superstructure—Bethlehem's engineers realized that the great length of the vessels and thus the necessary inclination of a shipway would raise the bow as much as 27 ft off the ground, with the attendant problems of support and higher gantries. In addition, shipbuilders say that when a vessel slides off the shipway into the water, strains are put upon it that are another problem for them. These strains are of a type not to be repeated, probably, during the vessel's life.

Solution, according to Edmund M. Burke, assistant to the vice president and chief engineer for the shipbuilding subsidiary, would be to build the ships on a level keel, in a graving dock, serving them with traveling revolving tower cranes which have great capacities, and whose booms would clear the ship for launching and make possible any reasonable height of prefabricated assemblies.

An area for such a dock existed at the Quincy yards—the location of shipways Nos. 4 through 9, built well before World War I.

• **Plan of action**—The first step was demolition of the heavy steel work that supported the bridge cranes over the five old shipways, then followed the demolition and removal of the foundation and concrete shipways themselves. Thereafter came the driving of sheetpile cells that would close off the excavation and—according to the design—be left in place to form the side walls of the new dock.

Soil explorations, meanwhile, had developed data showing that the entire area consists, from the top down, of layers of sand and gravel, fine sand, yellow sand, soft blue clay, and hard,

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Let's also take a look at what faster loading, easier maneuverability, instant shift, quicker spreading, and faster haul and return will do. Say it only gives you one extra trip per hour for each machine. For three machines and 10,000 hours, that figures 30,000 extra trips. At 14 yards pay for good common earth with three machines in the C Fullpak* Tournapull® class, that would be 420,000 yards. Again at the low-low of 30 cents that's $126,000 in PLUS profit. You can get it with a little extra speed that cuts cycle time.

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Do you want to swap that for a bargain price or a fancy trade? Remember that's purely the plus in profit, figured on the EXTRA yards only . . . not the basic yardage. And also, while we've figured on a 30 cent pay-yard, we don't believe you should be quoting 30 cents now. And we're sure, as the big road program gets over the engineering and right-of-way delays, you'll be winning bids on a lot higher price than that over the years ahead.

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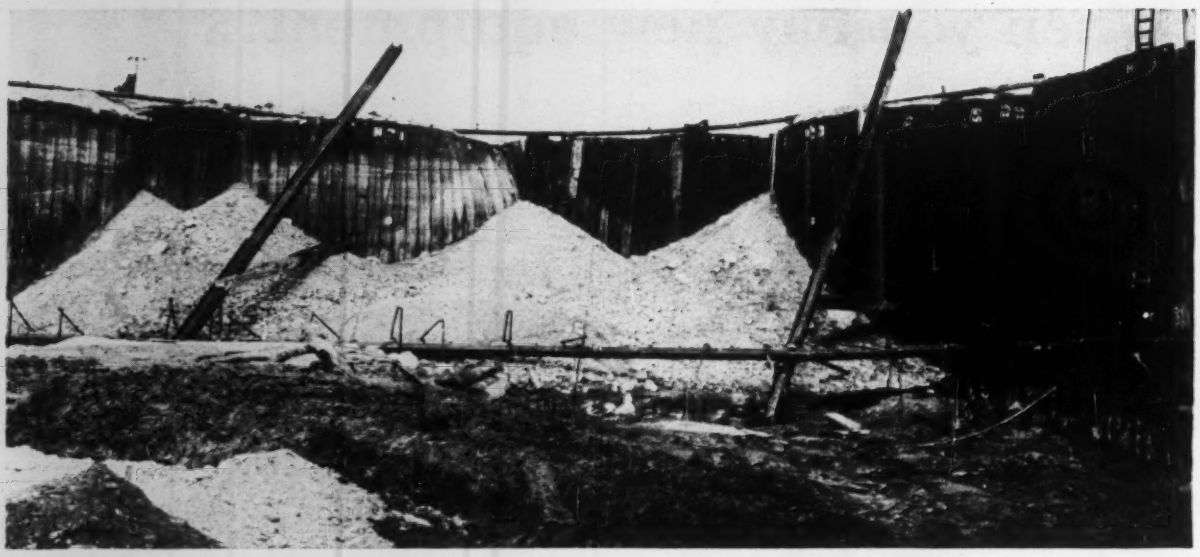
. . . Three-piece drydock built as one



EARTH BERM and temporary sheeting provide added support for outboard corner cell, which shifted before hydraulic fill material had consolidated. Similar cell on other corner was braced by cables.

coarse, sand and gravel. Interspersed in these layers are random pockets of silt, silty sand and some clay. The amount of infiltration from the Fore River side (the river is, in fact, a salt water estuary) of the area was apparently negligible, and the amount of groundwater that would have to be removed by pumping during excavation was considered small enough to be of no major consequence.

Bethlehem now called in Daniel Marr, Inc., of Boston to demolish the structural steel carrying the gantries, and the Lipsett Corp., of New York to remove the ways and foundations. An additional contract was awarded to the Arundel Corp., Baltimore, for removal of an estimated 350,000 cu yd of material from the basin.

• **Design developed**—Detailed design for the facility was a basin with the top of its floor 18 ft below MLW, measuring 920 ft in length at the centerline (from west to east with the bay at the east end), and 500 ft in width from north to south. The inshore end, on the west side, is an arc, so that the north and south are walls 785 ft in length to the point of curvature. This total area is then divided into three basins for shipbuilding, the basin in the center to provide 150 ft of width and those on either side 132 ft.

The two longitudinal walls or bulkhead separations forming the basins are designed as steel plates, braced on the sides and surmounted by tracks for the traveling cranes and a concrete roadway. Under the craneway structure will be facilities for shipbuilding crews. The actual width of the space occupied by the craneways, walls, braces and facilities is 30 ft.

Two areas at the north and south sides of the basin itself—each 85 ft wide and each served by two-legged bridge cranes—will provide space for sub-assembly of the various parts of the ship being built in the basins. These areas are bounded at one side by the cellular wall of the dock, on the other by sheetpile walls cutting them off from other yard structures. They will be paved with an 8 in. reinforced concrete slab.

Because of the nature of the underlying soil, it was decided that a reinforced concrete slab, 4 ft thick, would serve as the floor for the entire basin, except in an area 30 ft from the outshore end, where the slab would be 6 ft thick.

This slab is to be of the relieved type, resting on a 2 ft inverted drain—a 1 ft layer of coarse sand and gravel covered with a 1 ft layer of 2 in. stone. This drain is served by porous concrete pipe, with a main collector pipe 2 ft in diameter, running the length of each basin, fed by 12 in. laterals spaced 30 ft on centers. The pipe was supplied by Walker Porouswall Pipe Co., Little Ferry, N. J.

The tide gates at the outshore end will be 132 ft and 150 ft (for the center basin) in length, 32 ft high, hinged at the bottom. Valves within the gates will be used to flood a basin on the tide.

Dewatering will be relatively simple: At low tide roughly 10 ft of water will be removed, the gates will be closed (by raising them with the cranes) and the remaining water pumped out through two pump wells at the outshore end of the basin.

• **To work**—While these plans were in formation, demolition work had gone fast, and early in 1957 a further contract was let to the B. Perini Co., Inc., of Boston, for construction.

Perini's contract covered construction of the basin and 150,000 yd of excavation. The shipbuilding company agreed to furnish all steel for reinforcing and sheeting and other components of the facility, and will erect the trestles and cranes.

Engineers for Bethlehem estimate that the total cost of the facility will be about $13 million.

While demolition was being cleaned up, Perini moved in pile driving equipment. His first move was to begin driving the 44 sheetpile cells, each 43 ft in diameter, which will permanently enclose the dock. The 11 temporary cells that close off the water side, each 49 ft in diameter, were to be driven after dredging had been completed.

In this operation, the contractor took advantage of a natural ground condition (with the approval of the engineers) and began driving the cells at the inshore end and on the two sides of the dock. Since the existing ground level was at the design grade of the tops of the cells, some 22 of them were driven like giant cookie-cutters, with no subsequent filling. The ⅜ in. thick sheets were driven to a point 55 ft below ground level with the strata of sand, clay and hard sand providing sufficient anchorage.

While this driving operation was in process, Perini also moved in land excavation equipment, to take out some of the material at the inshore end of the basin Arundel Corp moved its big

You can continue moving dirt profitably, well into winter, if you follow the simple cold-weather procedures outlined below.

Don't let winter freeze your profits!

Cold-weather tips to help keep your dirtmovers earning — in spite of snow, ice, and zero temperatures

Add anti-freeze — Drain and back-flush cooling system. Check and repair leaks in radiator, water pump, gaskets, hoses, and connections.

Refill cooling system with solution of anti-freeze — preferably "permanent" ethylene-glycol type, mixed with clean, clear water — for protection against freezing to below lowest anticipated temperatures.

If you hydroflate tires for added weight and traction, use calcium chloride solution. Chemical adds more weight, and 5 lbs. per gallon of water protects against freezing up to -40° F.

Use winter oils, greases, fuel — Drain summer-weight oils from engine, transmission and final drive; flush-out sediment and sludge. Refill with winter-weight oils, as recommended in your equipment manual.

Continue lubrication, per your regular summer schedule. Check lubrication instructions for points where winter-weight greases are required.

Summer fuel may be a little heavy for winter operation, so be *sure* the pour point is low enough to permit it to flow freely thru fuel lines and injectors at low temperatures. Your fuel dealer can advise you on this.

Drain water and dirt from fuel tank and filters. Keep fuel clean at all times; and be doubly sure to keep water, ice, and snow out of fuel and tank. Always strain dirty fuel.

Watch your batteries — Keep batteries well charged and check charge more frequently than in summer. A low-charged battery may not get you started, and it will freeze more easily than a full-charged one. Replace batteries nearing the end of effective life . . . it pays-off in sure starts, especially in cold weather.

Check battery water often. Add necessary water after morning warm-up so it can mix thoroughly with battery electrolyte. Water added while machine is cold or shut down may freeze and ruin the battery.

Adjust generator for proper charge rate. Check headlights . . . you may need them on short winter days.

Cold morning procedures — Be sure air-supply tank drain-cocks are closed. Gradually warm engine to operating temperature by idling at half-throttle for a few minutes, to insure thorough circulation of oil. If engine does not heat properly, check cooling system thermostat.

If engine is hard-starting in extreme cold, pre-heat the intake air. Some engines are equipped with pre-heating devices. On others, careful use of a blow torch on intake manifold will usually do the trick. Below 20° F, it may be advisable to drain and heat crankcase oil to 200° F, then pour back.

There are several good cold-weather starting aids available. Most employ ether, or other highly volatile fuel, for a starting charge, either in capsule or pour-in liquid form. Compared to the cost of possible delays, special cold-weather starting equipment pays-off.

Check tires daily. A sharp rise or fall in temperature will change tire pressure by several pounds.

Working in frozen ground — Break-up hard, frozen, top layer of ground with Rooter or dozer. Scrapers can then load easily.

If load-carrying capacity will permit, reduce tire pressure slightly to cushion shocks on rough, frozen ground. However, avoid rolling over sharp chunks of frozen earth whenever possible.

Keep engine temperature within proper operating range — 160° to 185° F. Partially cover radiator and/or engine compartment, if necessary.

Prepare for cold nights — When parking overnight, or for any length of time, place planks or other blocking under scraper or dozer blade before lowering, to prevent blade freezing to the ground.

Bleed water condensate from air-supply tank. Make sure drain-cock is again closed. For added safety, put ¼ pt. (4 oz.) alcohol in air tank to prevent freeze-up of moisture collected in lines during operation.

Test degree of protection of anti-freeze *daily*. If you're operating without anti-freeze, drain the radiator, engine block, air compressor and oil-cooler jackets each night. If below 20° F is expected, drain crankcase oil for pre-heating in the A.M.

Remove all dirt from scraper bowls and dozer blades at end of day, so it doesn't freeze tight overnight. To keep dirt from freezing on during the day, spray or brush-on a coat of drain oil.

For free copies of this winter maintenance article, write LeTourneau-Westinghouse Company, Peoria, Illinois. Please state quantity desired.

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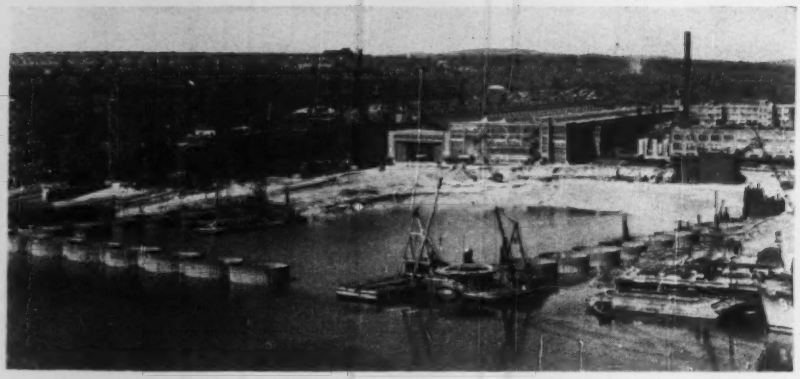
Where quality is a habit

. . . Three-piece drydock in one



OLD-TYPE inclined shipways, like those at left, were torn out to make room for new facility. Proximity of yard shops makes location excellent from manufacturing standpoint.

8 cu yd hydraulic dredge into the area to begin taking out the major part of the material.

• **Dredging difficulties**—When Arundel's dredge began to work inshore, sloughing developed in the shipyard area outside of the construction site.

The area is overlain by a very fine silt, of the consistency of silty beach sand and clay, which has a low angle of repose when submerged. When dry, however, it will stand on a sheer cut of very close to 90 deg., and is firm enough to be acceptable, according to Bethlehem's engineers, as fill material for highway jobs. However, with dredging in progress, this silt material began to flow near a number of cells being driven.

Dredging was halted until Perini was able to put in the sheetpile cells down the full length of the north side of the new dock, to hold the material in place and permit it to stabilize. This done, excavation has continued without further major difficulty.

When Arundel had completed its contract, Perini proceeded to close the outshore end of the area with the 11 cells previously mentioned, and brought in a small hydraulic dredge to complete the excavation to sub grade. The material removed was pumped as fill into the open cells at the outshore end.

Further trouble developed in the cells at the southeast and northeast corners, after the area had been dewatered about two weeks. The two corner cells slowly shifted a maximum of 1½ ft at the top, and about 1 ft at the bottom, before the cells could be drained and as the full head of pressure from the bay came against them and as material was removed inside the area.

The remedy—admitted by Bethlehem's engineers to be "not pretty but it works"—was this: The cell at the south corner was simply tied back to a sheetpile wall that had been driven previously to form the outer edge of the platen area. This tieback (by means of cables) appears to be sufficient to hold the cell in place.

On the north corner, a second arc of sheeting was driven about 10 ft in front of the original cell wall, facing the dock area. This space then was filled with compacted material. An earth berm was thrown up inside the dock area to prevent further shifting. Observation has shown no additional movement.

Some of the other cells along the side wall have shown openings near the bottom at the interlocks—possibly due to boulders and old piles—and these have been strengthened by welding metal straps horizontally across the interlock.

• **Floor goes in**—Meanwhile Perini's forces, under the eye of Irving R. Huie, general superintendent, moved into the dock area to begin work. An earth ramp was used for access.

Moving fast, the 350 man work crew began a number of operations which now are being carried out simultaneously or a 6-day-a-week, 24-hour-day schedule:

One crew is finishing up the driving of three lines of cutoff sheet-piling that will divide the three basins underground, the sheets being driven to about 30 ft below the level of the dock floor. Another crew is placing the drain and base materials, beginning with the coarse sand and gravel layer that is compacted with steel wheel rollers.

The reinforcing cage for the floor slab now goes in. It consists of a ⅞ in. and ⅝ in. bars in top and bottom layers. Using 3,000 lb concrete, delivered by ready mix trucks, Perini starts by pouring two outside slabs, in widths of 20 to 30 ft, in order to save formwork, since inner slabs between them can be cast without inside forming. The concrete is cast at full depth in a continuous operation, vibrated, screeded and broom finished to give a rough surface—insurance against accidents to shipworkers during icy weather.

As evidence of the accuracy of original predictions of very little groundwater, a 600-point wellpoint system has produced a maximum of about 1,500 gpm, and in early November was producing less than 300 gpm. The water is fresh and quite cold, and shows little evidence of infiltration from the brackish water of the river.

• **Divider walls**—At the site of the two divider walls, the contractor leaves a 1 ft deep slot to act as toehold for the structural steel bulkhead.

These walls, unusual in U.S. drydock construction practice, are composed of sheets 32 ft long, 8 ft wide, and ⅞ in. thick, and angle stiffeners on one side, with interlocks at either end so that the pieces slide together to form a tight wall in the manner of sheetpiling. Once in place, the sheets will be welded together along the interlock and the base grouted into the slot in the floor slab for water tightness.

Supporting these walls against lateral pressure are a series of 14 in., wide-flange 72 lb diagonal braces about 18 ft in length. These rest on a series of concrete pedestals set directly on the dock floor about 15 ft out from the wall, on 8 ft centers.

Resting on the same line of pads that support the braces, vertical steel columns, each 32 ft high on 16 ft centers, will extend upward to form a trestle on which the craneway will be placed.

(The craneways on the main walls of the basin will have one leg supported directly on a pile-supported footing on the cells, but the other supported on similar concrete pads and steel columns extending to the basin floor.) The total width of the divider wall, craneway and supports will be 30 ft.

Each of these craneways will carry two traveling cranes, each of which weighs about 285 tons without load. The cranes are capable of lifting a maximum of 75 tons at an 80 ft radius.

A total of twelve cranes will serve the installation, eight of them being travelers and four of them 2 to 10 ton capacities serving the platen or welding areas.

Dewatering of the docks will be handled through two pump wells, placed one on either side of the central basin. The pump wells themselves will be 30 ft by 28 ft, each of them housing two 2,000 gpm and two 12,000 gpm pumps.

A total of 80,000 cu yd of concrete will go into the floor slab, platens and the crane runs.

The sheetpile cell walls will be protected by a painted-on corrosion-resistant material.

A. E. McGuire is resident engineer on the job for Bethlehem Steel.

LORAIN MOTO-CRANE walks with... 19-ton girders

This operation called for top performance from men and machine. The job—pick up girders weighing up to 19 tons, travel them suspended over the rear out on the falsework and swing them in position on a new bridge structure.

These tasks were accomplished swiftly and smoothly by Campbell Crane and Trucking Service, Inc., Portland, Oregon, using a 35-ton Lorain Moto-Crane, model MC-530W, with 8 x 4 carrier, on the new Eugene-Springfield Bridge, which crosses the Willamette River. *Campbell owns 12 Lorains.*

Here are a few of the many features of this Lorain MC-530W which make this kind of profitable performance possible:

- The 8 x 4 carrier has four axles, mounted on front and rear bogies for improved weight distribution, better soft-ground flotation, better steerage. Both front axles steer.
- Three position turntable mounting—adjustable for (1) maximum crane capacities over the rear for lifting or traveling with loads, (2) for general purpose crane and clamshell service, and (3) for maximum digging ranges for dragline, shovel and hoe service.
- "Shear Ball" turntable mounting—no rollers, no center pin . . . completely sealed, no adjustment or lubrication problems.
- Square-tubular-boom—lighter and stronger—lifts more, reaches out farther and higher.

These are just a few important advantages that make the Lorain MC-530W an all-around performer on the big jobs. Ask your Thew-Lorain Distributor for the full story.

Increased Capacities with "8 x 4" Carrier

On the Lorain Moto-Crane, model MC-530W, 8 x 4 carrier, there are no springs, front or rear. Both front and rear bogies are mounted on solid-walking beams. By removing front spring action, this exclusive, rigid design enables the 8 x 4 carrier to produce greater lifting capacities than three-axle carriers or ordinary 8 x 4 carriers with spring-mounted front axles. This feature alone puts the Lorain Moto-Crane, model MC-530W, in a class by itself. There's nothing like it.

ASK YOUR THEW-LORAIN DISTRIBUTOR ABOUT THE

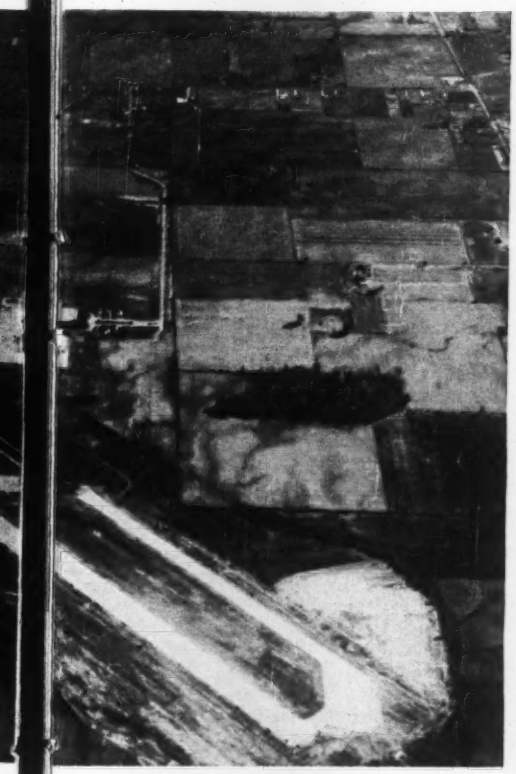
THEW LORAIN
MC-530W
THE THEW SHOVEL CO., LORAIN, OHIO

NEW Northeast-Southwest runway of reinforced concrete, is light-colored continuous stretch. To its right is old runway which has been extended and will serve as taxiway for planes using the high speed turn-offs.

As the plane crosses the center-line of the runway at more than 60 mph and starts wheeling into the curve, the parabolic crown of the runway gently tilts the plane into a banking position, as high speed . . .

Turn-offs and Flush Center Lights Speed

PAVING TRAIN at work on north portion of the new runway at Indianapolis Municipal Airport. The concrete runway was reinforced with sheets of welded wire fabric. In background, clustered about batching plant, are stockpiles of sand, aggregates and steel.



up Landings

The first installation of superelevated high speed turn-offs for airport runways has been completed at the Indianapolis Municipal Airport. Another first at the same field is the installation of flush centerline runway lights.

The reinforced concrete runway, some 7,300 ft long, has three of the quick turn-outs, designed to permit pilots to clear the main runway at speeds up to 63 mph.

Flush center-line lights were installed experimentally by the Civil Aeronautics Administration's Technical Development Center on one of the turn-offs in order to test their night-time effectiveness as an aid to the pilot. (Experiments with high-speed turnoffs and flush centerline lighting are also being conducted at Dow Air Force Base, Bangor—ENR Nov. 14, p. 40).

Two of the turn-offs will handle planes landing from the southwest, a third will take planes from the northeast. The turn-offs offer a banking effect to the turning plane by having their inside edges a foot lower than the outside of the curve, describing an easy 955 ft radius arc.

The super-elevated turn-off, might be called "super-depressed", according to the designer, A. W. Compton, of Clyde E. Williams & Associates, Inc., South Bend. He explains that by depressing the inner radius instead of elevating the outer radius, he was able to blend the cross-sectional profile of the main runway into the turn-off.

As the plane crosses the center-line of the runway and starts wheeling into the curve, the parabolic crown gently tilts the plane into a banking position, and it is this banking curve that is continued into the curved taxiway without perceptible change.

These banked taxiways will permit the landing of one aircraft every 30 sec during visual flight conditions and one every three minutes during instrument flight periods.

• **Light plan**—The experimental lights were located at the second southwest approach turn-off, near the northeast end of the runway.

Conventional runway and taxiway lighting consists of units approximately 18 in. above the ground along both edges. At Indianapolis, 12 white lights are countersunk at 100 ft intervals along the centerline of the Northeast-Southwest runway, with a line of blue flush lights along the centerline of the turn-off, "peeling off" from the ring of white lights.

A bar of three blue lights, also countersunk in the runway, marks the intersection of runway and turn-off center-lines. In addition, a countersunk flashing blue light, 500 ft ahead of the turn-off, alerts the pilot of the coming turn.

In practice, the pilot will put the nose of his plane on the line of white lights, and veer off at 60 mph onto the turn-off by following the line of blue lights. With this installation, it is hoped to test the performance of flush lights under all weather conditions, as well as arrive at an evaluation of their effectiveness in aiding pilots to clear runways quickly under heavy traffic.

The units being tested consist of cylindrical sheet metal castings, about 13 in. in dia and 18 in. deep. Each has its own transformer, a 250 watt lamp, a color filter, and a metal cover and prism arrangement. The prism, recessed into the cover, emits a 20,000 candlepower signal beam 2 deg high and 15 deg wide. The 2 deg height of beam is calculated to be visible to the pilot at an average cockpit height of 20 ft, 600 ft down the runway. The 15 deg lateral dispersion will permit the pilot to see the blue line of turn-off lights as he approaches from the side.

Depending on weather conditions, the brightness of the centerline lights can be adjusted by voltage regulators. The series circuit, high voltage line feeds the units through 2 in. cable ducts from a cable laid parallel along the edge of the runway.

Painting white and blue centerlines for daylight use is being considered.

• **Runway design**—The runway consists of a 12 in. thick mesh—reinforced concrete slab for 750 ft at both ends and 10 in. thick in the central four inside lanes. The two outside lanes in the central portion are 8 in. thick. The runway is 150 ft wide, constructed in six 25 ft wide lanes. These lanes key-locked longitudinally, with the outside lanes tied additionally by steel bars to prevent lateral movement.

Steel fabric for the 12 in. thick pavement is designated 6x12-00/1, weighing 86 lb per 100 sq ft, while the 10 and 8 in. thick slabs were reinforced with the lighter 6x12-0/2 at 74 lb.

The runway has sawed, weakened plane contraction joints every 75 ft but no expansion joints. The slabs are joined across the joints by sliding dowel assemblies. Except for the 12 in. thick pavement, each 25 ft wide lane was was sawed longitudinally down the center.

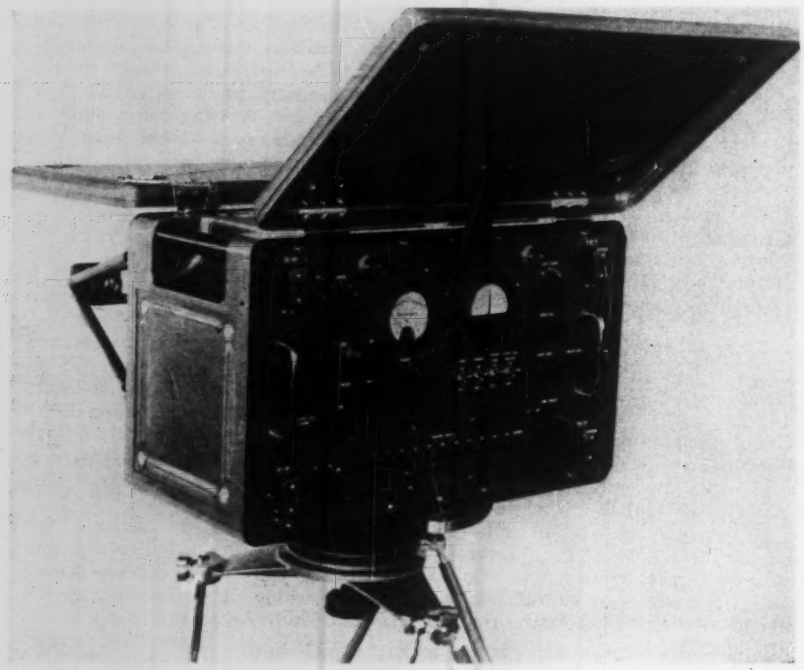
High early strength concrete was used with a retarder added to maintain control of the curing process during hot and windy days. The average 28 day test beams broke at 750 psi.

Teamwork was required of airport officials, engineering consultants, and the contractor, Gast Construction Co. of Warsaw, Indiana, to keep the more than $1.5 million job on schedule without interfering with air traffic. During construction the existing northeast-southwest strip handled most of the traffic. In fact, grading and paving operations went on while heavy commercial plane traffic used the parallel runway only 500 ft away. Coordination of control tower with radio cars, and hand signals relayed to contractor flag men, made this possible.

Concurrent with the construction of the new runway, the existing northeast-southwest strip was lengthened to 7,300 ft, and converted into a parallel taxiway which will serve the new facility and accommodate planes using the high speed turn-offs. The lengthened taxiway is built of 12 in. concrete, reinforced with welded wire fabric.

In addition to paving for the experimental flush lighting, the Civil Aeronautics Administration paid for 75% of the high intensity lighting installed for the runway. The runway and turn-off construction was also a CAA project, built on a matching fund basis with the Indianapolis Airport under the Federal Aid for Airports Plan. The flush lighting installation was done by the Harris-McBurney Co. of Jackson, Michigan, for $72,000.

The field, known as Weir Cook Municipal Airport is a city-owned facility.



Distance Measurement Device Uses Light Waves

A relatively low cost long distance measurement instrument using reflected light waves recently has been placed on the U. S. market. Known as the Model 3 Geodimeter, it joins larger and much more expensive Models 1 and 2, which have been used for the last five years by some governmental mapping agencies.

Model 3 has been designed and priced (at approximately $10,000) to serve the general trade in connection with baseline establishment, traverse surveying, hydrography, highway and pipeline surveys and geophysical nets.

Instrument range is 1 to 20 miles. According to the maker, average error is ±4 in. plus 2 millionths of the distance. Translated to fractional ratios, accuracies are within 1/16,000 at 1 mile, 1/120,000 at 10 miles and 1/190,000 at 20 miles.

The Geodimeter, or transmitter and control unit, measures 21 x 14 x 12 in. deep and weighs 50 lb. It is mounted on a 22 lb tripod and is powered by a 22 lb gasoline engine generator. A reflector—weighing 20 lb—mounted on a conventional tripod is required at the second terminal point.

Although theory of the instrument is difficult, field operation is simple. A man at the reflector site and a man at the Geodimeter sight the instrument in on the reflector, which is usually of prism type.

The Geodimeter operator pushes several "coarse delay" buttons in succession until a null meter stands near zero. A "fine delay" knob then is adjusted until the null meter holds zero and a distance scale is read. The knob adjustment is repeated for three other settings of a "phase" switch.

If the distance to be measured is known within 164 ft, the measurement is completed. If not, the same coarse and fine adjustment procedure must be repeated—for light waves modulated to a second frequency. In this case, the distance to be measured must be known to within 1¼ miles. The entire procedure—regardless of the distance to be measured—is said to take one hour.

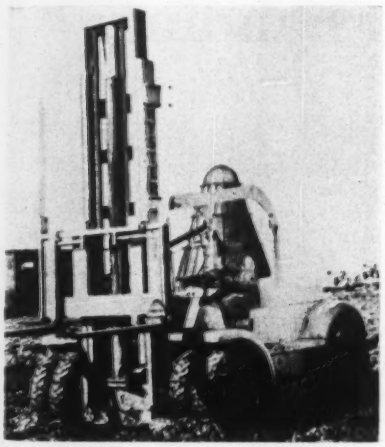
• **Theory**—An electronic "shutter" in the Geodimeter modulates the steady output of a normal light source so that its intensity varies as a sine curve of known wavelength. This "blinking" light is projected to the reflector, which returns it to a phototube in the Geodimeter.

Because the light does take a finite, albeit very short, time to make its loop, the phototube receives light of a different intensity, or different point on the sine curve representing intensity. This displacement in phase represents distance. The phototube converts light intensity into electrical current, which is measured and converted to distance.

The distance thus measured is some fraction of a quarter wavelength, which equals the speed of light divided by ¼ of the frequency or 186,000 mi per sec × 5,280 ft per mi ÷ (1,500,000 cycles × 4) = 164 ft. If the distance to be measured is known to within 164 ft, modulation of the light beam at one frequency is sufficient.

If not, the light is modulated at a second frequency, 2.5% greater than the first and the fractional quarter wavelength distance is measured similarly. The effect is that of a vernier in space which makes it necessary to know the distance to be measured within 6,560 ft or 100/2.5 x 164 ft.

The three models of the Geodimeter are manufactured by Svenska A. B. Gassaccumulator, Stockholm, Sweden and are available in the U. S. from Berg, Hedstrom & Co., 1170 Broadway, New York 1, N. Y.

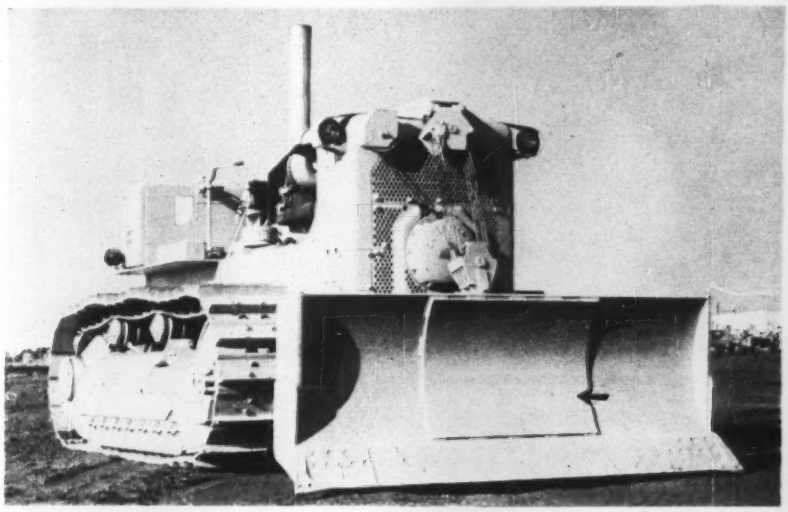


Add More Power to Lift Truck Capacity

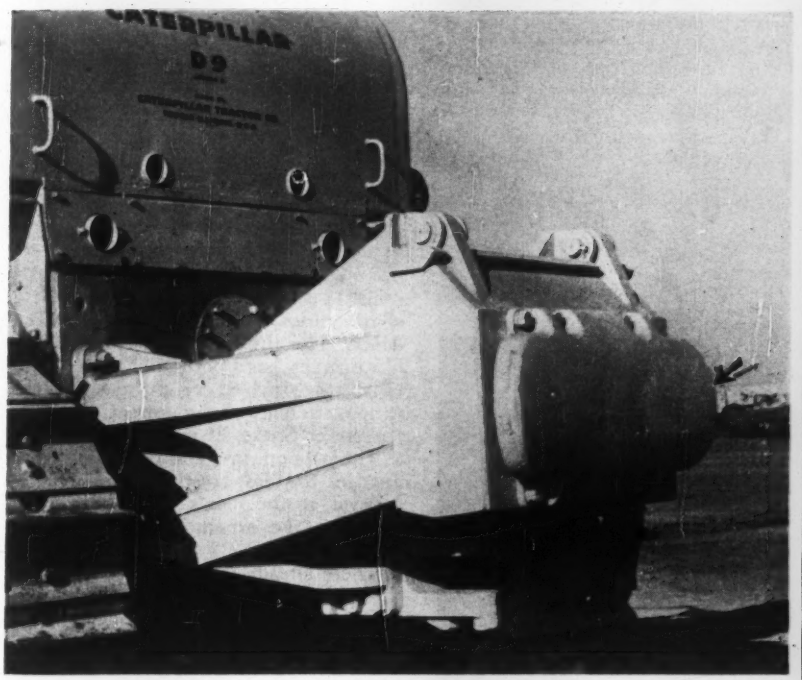
A 154 hp Chrysler V8 engine with a matching torque converter has been made available as optional equipment for Hyster lift trucks in the 15,000 to 20,000 lb load capacity.

The larger engine and torque converter transmission give the truck added power for handling large loads in rough, unimproved yard areas or where mud, snow or sand pose serious traction problems.

Towing capacity of the unit exceeds 250,000 lb. Hyster Co., 1003 Myers St., Danville, Ill.



Cushioned Metal Pads . . .



. . . Make Pushloading Quicker

Aimed at increasing production in earthmoving operations, the Peterson Tractor & Equipment Co. has put on the market the cushion push dozer and cushion push block.

The company claims that the cushion push is a unique and important feature of these two tools. Because of reduction in contact shock, total pushing time is reduced. Four heavy-duty shock absorbing pads cushion the tractor, scraper and operators from heavy impact. Peterson Tractor & Equipment Co., San Leandro, Calif.

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Photo by Buffalo Evening News

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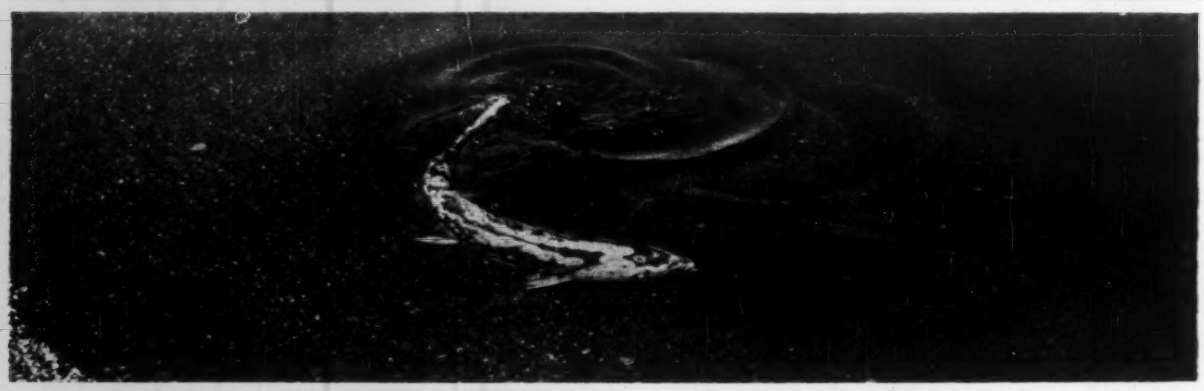


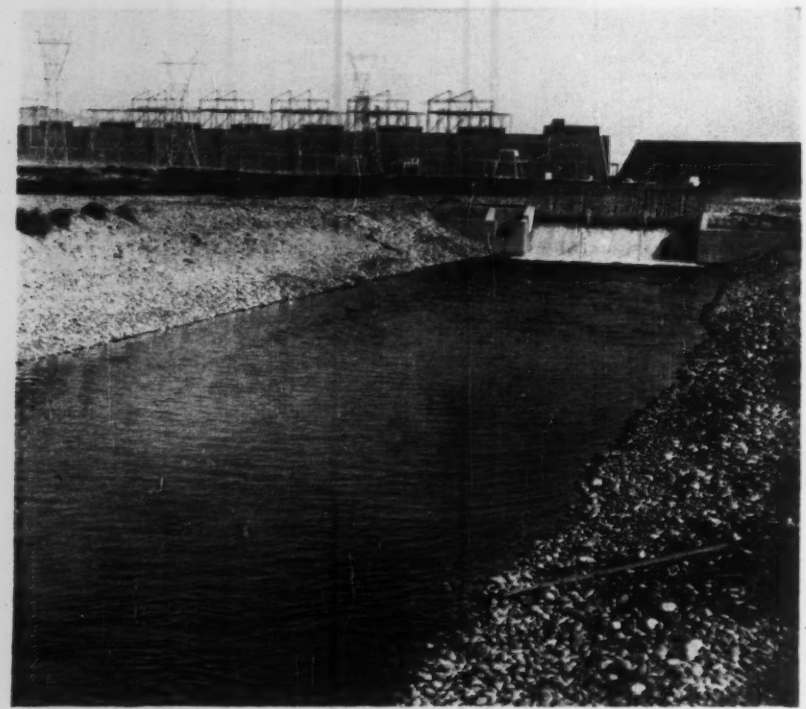
This gyrating chinook digging a pothole for its eggs could mean that . . .

Ladder Climbing by Salmon May End

An experiment being carried out by the Corps of Engineers at McNary Dam on the Columbia River may be the beginning of the end of those extensive and expensive—and sometimes impossible—fish ladders over extremely high dams.

What the Corps has done is to build, last summer, an artificial salmon spawning pool downstream of the dam and stock it with several hundred trapped chinook salmon. The hope is that instead of having spawning salmon and resulting fingerlings make their way past dams, they can be made to spawn and hatch in grounds that would be provided downstream of the dams.

First phase has proved successful: The salmon have paired off, laid and hatched their eggs. The question now is: Will these eggs mature and hatch this next spring?



CONCRETE WEIR separates sections of artificial salmon spawning channel.

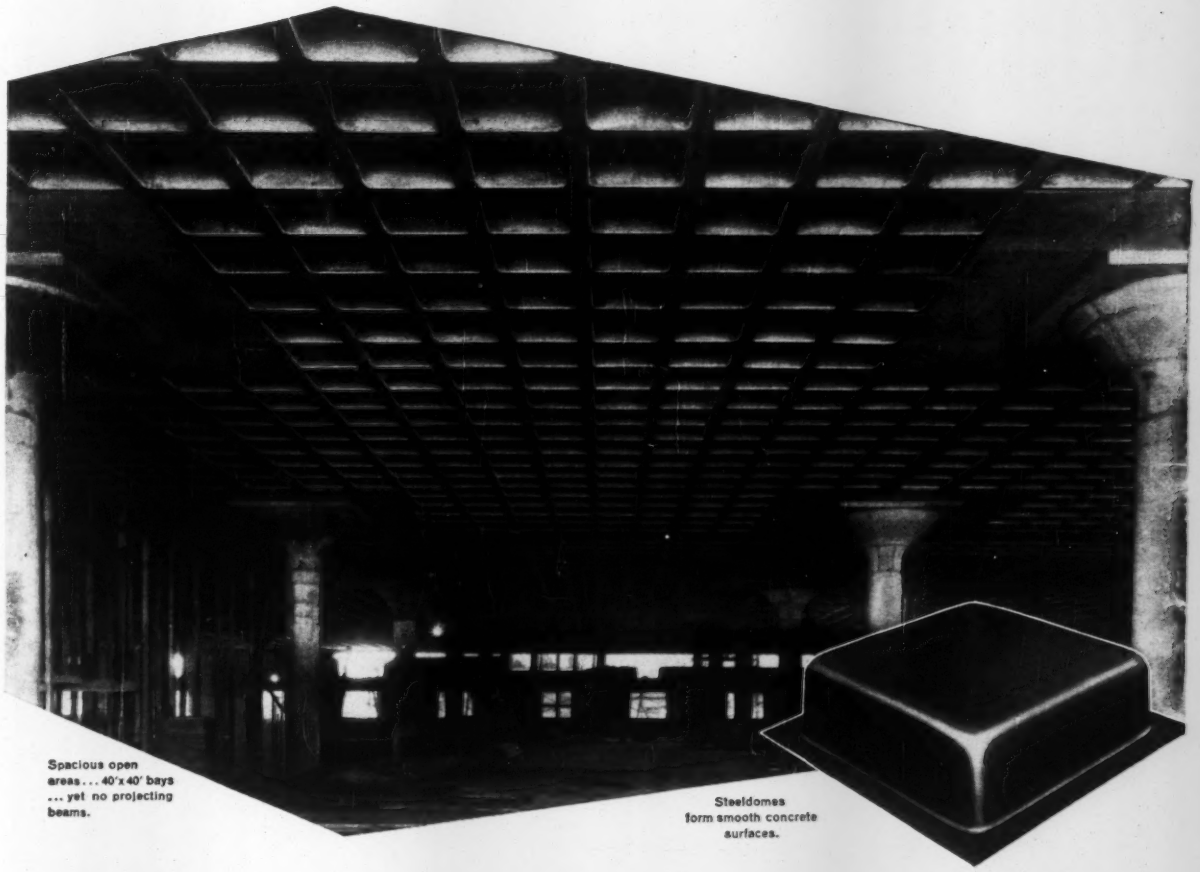
If they do, and if the four-year cycle is completed by the new salmon returning to spawn in the artificial channel, then the possibility of excluding provisions for passage of fish in future dams could be considered.

The McNary project is essentially a 20 ft wide channel divided into three independent 300 yd long stretches of water separated by screening devices. First stretch is a pool with a sandy bottom simulating conditions behind McNary Dam pool. Downstream from this, separated by a stationary concrete weir, is the second stretch that simulates a running stream with gravel on the bottom. This is similar to creeks and rivers of tributaries upstream along the Snake River. The third station, separated in like manner, has a bottom of run-of-the-river gravel such as would be found in various stretches of the upper Columbia and lower Snake Rivers.

The salmon in question have been put in the last section after being trapped at the dam's fish ladder and carted to the experimental station by truck.

There already is some evidence that the artificial spawning grounds will be a success. A large recreational swimming area created by the Oregon State Park Board some seven miles upstream of McNary Dam, at Cold Springs in Hat Rock State Park, has been sought out and used for spawning by stray chinook. And this fall, the four year cycle was completed by returning salmon. However, "strays" will tend to explore and their choices were voluntary. It will take the controlled experiment now under way to make a firm statement about artificial spawning grounds.

EXPANSIVE?—YES EXPENSIVE?—NO



Spacious open areas... 40'x40' bays ... yet no projecting beams.

Steeldomes form smooth concrete surfaces.

CECO STEELDOME CONSTRUCTION

Wide 40′ x 40′ bays can be built with savings up to 30%

How to get wide open space in buildings and yet meet a budget is a problem faced by architects and structural engineers. This is difficult to achieve—but there is a solution—two-way slab construction formed with Ceco's new one-piece Steeldomes.

Employing this method, 40′ x 40′ bays supporting 150 lb./sq. ft. live load were built economically through the teamwork of Friedman, Alschuler & Sincere, architects-engineers, and contractor Wm. E. Schweitzer in constructing the plant and warehouse for Crescent Industries, Inc., Niles, Ill. A pilot study showed Ceco Steeldome construction was the most economical of all. Savings up to 30% were indicated.

Dome construction is essentially flat slab design with voids. The voids reduce deadload—the joists provide rigidity. Erection is fast and economical, on simple one-way open wood centering. With Steeldomes, the exposed waffle pattern presents a high-quality finish. Added to that, you get the advantages of wide open space and lower cost. On the Crescent project Ceco also supplied reinforcing steel and hollow-metal doors and frames. Ceco Steel Products Corporation. Sales offices, warehouse and fabricating plants in principal cities. General Offices: 5601 West 26th Street, Chicago 50, Illinois.

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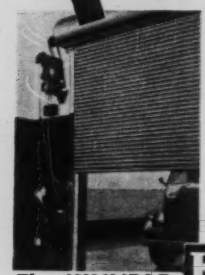
Steelforms / Concrete Reinforcing / Windows, Screens / Hollow-Metal Doors / Metal Lath / Steel Joists / Roofing Products

Kinnear Rolling Doors



Kinnear *originated* the upward-acting door with the curtain of interlocking steel slats. For more than half a century, Kinnear has built doors *exclusively*—your assurance of highest quality. Write for Kinnear catalog!

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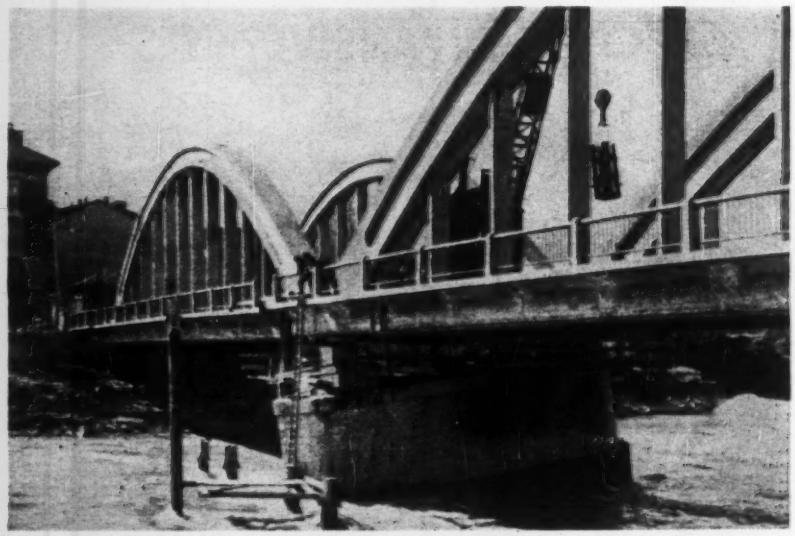
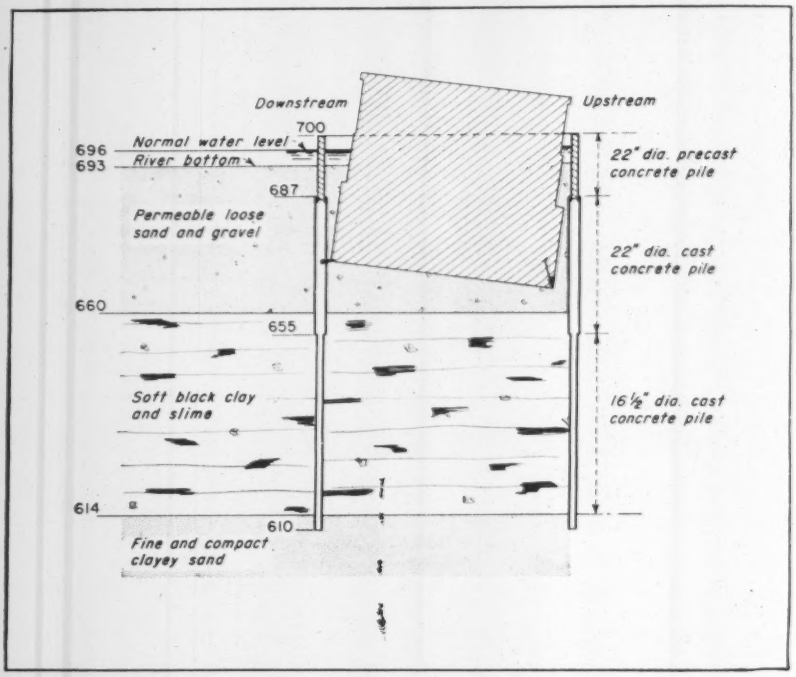


TILTED PIER is protected from further scouring by a belt of concrete piles.



CONCRETE PILES form a firm foundation structure for the rebuilt pier.

Piles Restore Bridge Pier in France

German demolition efforts during World War II have been haunting French engineers near Grenoble, as they struggled to put a river crossing back in service. According to the French magazine TRAVAUX the job has just been completed.

When the Drac River went on a rampage in December of 1954, it's floodwaters put the Cours Berriat Bridge —which is located between Grenoble and Fontaine—out of service. The pier near the left bank of the stream tilted and sank about 5½ ft, moving horizontally about 4½ ft in the process and, at the same time, twisting two adjoining spans.

Project: New Inland Steel Building, Chicago, Ill.

Architects: Skidmore, Owings & Merrill, Chicago, Ill.

General Contractor: Turner Construction Co.

1. PRETEST CROSS-LOT BRACING.

43 FT. EXCAVATION IN CLAY:

Here's how Pretest bracing, plus horizontal sheeting and soldier beams, successfully solved problems of complex foundation job

This 19-story, unique steel structure required one of the deepest excavations of its kind in Chicago (43 ft. below curb). Problem: excavate and sheet in soft clay . . . install 393 steel bearing piles for a foundation . . . do all this without imperilling adjacent buildings, streets, subway tunnel.

How Spencer, White & Prentis specialists matched wits with these obstacles is shown in the photo above. Together with horizontal sheeting, Pretest bracing played a big role. This method (like our Pretest underpinning) assures that the full pressure is carried, thus minimizing movements.

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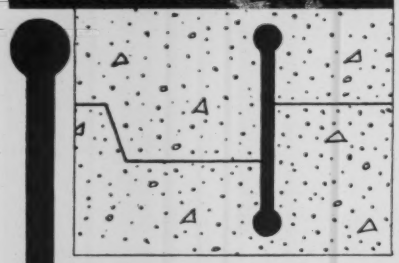
RUBBER
WATERSTOPS
FOR MASONRY CONSTRUCTION JOINTS



Williams Efficiency Waterstops are made from Natural Rubber Stock, and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners—will not tear from shear action. Tensile Test: 3990 lbs.; Elongation Test: 650%. Available in rolls up to 80 feet in length. Field splicing is simple. Williams Waterstops can also be furnished in Neoprene for industrial uses where resistance to oil and other injurious wastes is desirable. These highly effective Waterstops are now in use in hundreds of industrial plants, commercial and public buildings throughout the country.

See Sweet's, or Write for Information.

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EQUIPMENT and SUPPLY CO.
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MAYO
PNEUMATIC GROUTER
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"PEA SHOOTER"
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Highly Efficient

The Mayo Grouter quickly and easily places low-pressure grout in tunnels, mines, shafts, foundations, and subgrades. It also may be used to inject sodium silicate emulsions for stabilizing caving or running ground.

This versatile piece of equipment can readily be converted to a "Pea Shooter" for shooting Pea or "Birds Eye" gravel back of liner plates and backpacking outside lagging plates.

Write for Free Bulletin 13 for full details and specifications.

MAYO
TUNNEL AND MINE EQUIPMENT
LANCASTER, PENNA.

Cause of the accident was turbulence set up by the wreckage of an older bridge, destroyed by the German Army in 1944. Wreckage of this structure was left in the streambed when the bridge was rebuilt after hostilities were ended. The heavy eddy created by the submerged wreckage caused scouring under the bridge pier.

• **Restoration plans**—How to reconstruct the bridge at the least cost was the problem turned over to Enterprise Pascal, of Grenoble, under a reconstruction contract.

Since demolition of the entire bridge would have been difficult in the heavily populated area surrounding it, and since the other pier and the spans themselves remained in relatively good condition, the French engineers made up their minds to reconstruct the existing structure.

The first task was to straighten out and realign the two sagging spans. This was done with two 200 ton jacks, bearing on the tilted pier. When raised to the proper height, the spans were blocked onto the pier with reinforced concrete blocks separated by lead sheeting in order to assure proper load distribution.

Ultra-sonic inspection of the reinforced concrete spans confirmed the fact that they were basically sound excepting at the points of visible fracture, where they could be repaired satisfactorily. The decking itself suffered only a few minor separations.

• **Reconstructing the pier**—While the tilted pier had come to a position of stable equilibrium, renewed scouring during the reconstruction always was to be feared.

Two means of protection were possible: Either the old wreckage could be removed, which would mean sinking a caisson, or the tilted pier could be surrounded with joined piles for protection from further scouring. The latter method was chosen.

The normal depth of the Drac River is about 3 ft. Below this extends a 33 ft layer of permeable sand and gravel, and then a 40 ft layer of soft clay. And below this is a fine and compact clayey sand.

The engineers also decided to use the piles as a foundation for the rebuilt pier. To serve this purpose, the piles reached a length of 88 ft, to extend into good ground.

To form each pile, a temporary tube was driven into the river bottom and the inside was scraped clean. A 22 in. dia bit then was driven to penetrate the clay layer some 4 ft. Then a smaller bit of 16½ in. was driven about 44 ft more until the compact sand was reached.

By use of a central tubing lowered into the driven hole, concrete was placed and the tubing then progressively raised. When the bore had been completely filled, it was topped with a precast section of 13 ft length and 22 in. in diameter. Reinforcing steel anchorage set into the fresh concrete assured adequate bond.

After the piles were cast and placed, they were joined to their neighbors at the top by means of lateral grooves and angle irons in the precast head.

Finally, the piles were surrounded with riprap and the space between the pier and piling was grouted.

Once this was done, the job of extending and widening the existing pier was carried out, and a structure to support the spans then was completed.

Then a 30 ton jack shoved the spans into horizontal alignment. After this was done, the work proceeded in repairing and reconcreting the decking and the spans.

Japan Planning Start of Four Multipurpose Dams

The Japanese Construction Ministry has announced it will start construction of four multipurpose dams in 1958, beginning in April. It will also continue construction work on nine dams started this year.

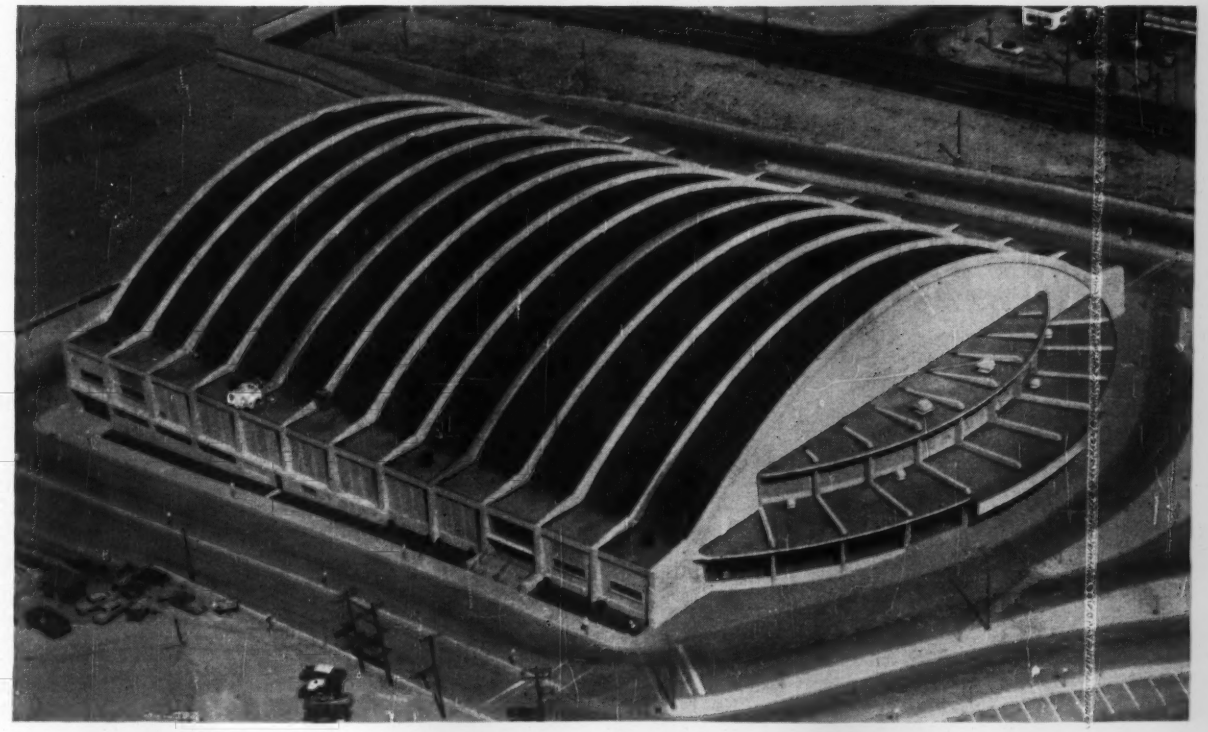
To finance work on these 13 dams, the Construction Ministry is seeking a budget appropriation of $23 million (at the latest exchange rate of 385 yen = $1).

The four new dams will be located at Minase in Akita Prefecure, Kawamata in Tochigi Prefecture, Yokoyama in Gifu Prefecture, and Sonohara in Gumma Prefecture.

Argentina Signs Contract For Study of Tidal Power

The Argentine Water and Power Board has signed a contract with SOGREAH (Societe Grenobloise d'Etudes et d'Applications Hidrauliques) of Grenoble, France, to carry out preliminary studies for 600,000 kw tidal power plant.

The plant would be located at the Valdes peninsula, which has unique tidal conditions. Although the peninsula is only 4.8 miles wide at its narrowest point, high tide occurs on one side at the same time it is low tide on the other side. Thus, the ebb and flood tides could be exploited by cutting a channel across the isthmus.



Denver's Coliseum...

Illustrates Versatility of Concrete for Arena Buildings

Denver's Coliseum is a handsome example of the functional use of concrete for arenas requiring uninterrupted enclosed space with minimum maintenance. Its arched construction requires no supporting pillars and provides a clear and unobstructed view of the entire arena area. Only concrete, the completely plastic building material, can be so molded and formed into any shape with all of its strengthening reinforcement inside.

Throughout the long years of its life, this concrete building will be virtually maintenance-free—a joy both to taxpayers and to spectators who attend the public functions held therein.

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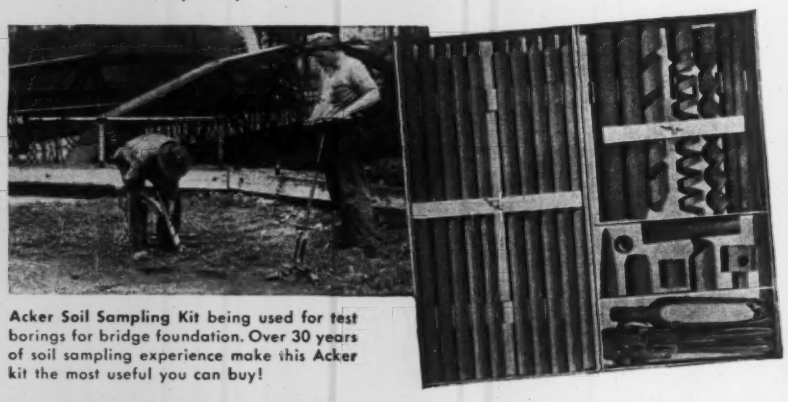
Write today for prices and Bulletin 26.



Acker Soil Sampling Kit being used for test borings for bridge foundation. Over 30 years of soil sampling experience make this Acker kit the most useful you can buy!

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Obituaries

Ralph W. Foster, 52, consulting engineer, died recently in Harrisburg, Pa. Mr. Foster was a vice president and director of Gannett, Fleming, Corddry & Carpenter, Inc., of Harrisburg, at the time of his death. He was a 1926 architectural engineering graduate of the University of Pennsylvania.

Steven F. Holtzman, 84, retired engineer, died November 19 in Yonkers, N. Y. He received an architectural engineering degree from the University of Illinois in 1895. For many years he was president of the now defunct Gunvald Aus Co., Inc., a structural engineering firm in New York City. During World War II, he came out of semi-retirement to work for the War Production Board.

Edward C. Hedger, Sr., 65, engineer, died recently in Cincinnati. He was senior partner in the engineering firm of Hedger & Fielding. He was former city engineer for Dayton, Ky.

Harold A. Swift, civil engineer, died November 15 in Scranton, Pa. He was a structural engineer for Babcock & Wilcox Co. of Scranton.

Charles F. Ast, 62, engineer, died November 19 in Buffalo, N. Y. He was a civil engineer for the Division of Buildings for the City of Buffalo during the last eight years.

Frank T. Tighe, 66, Woodstown, N. J., a civil engineer in the road construction business, died December 8. He was a graduate of the U. of Pennsylvania.

Thomas S. McGilvray 97, engineer, died in Duluth, Minn., November 25. He was a railroad engineer in Canada before moving to Duluth in 1887. As Duluth city engineer in 1904, he designed the original version of the aerial bridge spanning the ship canal in Duluth Harbor.

Lyman F. Copeland, 73, retired regional bridge engineer for the U. S. Bureau of Public Roads, died November 23 in Denver. He had completed 40 years of service with the federal government at the time of his retirement—35 years of which were in the Rocky Mountain area. Prior to his work with the government he was employed by the Illinois Central Railroad and the Kansas City Terminal Railroad. Mr. Copeland, a past president of the Colorado Section of the ASCE, was a graduate of Worcester Polytechnic Institute and received his professional degree of Civil Engineer from the University of Colorado.

Tru-Stop Brakes

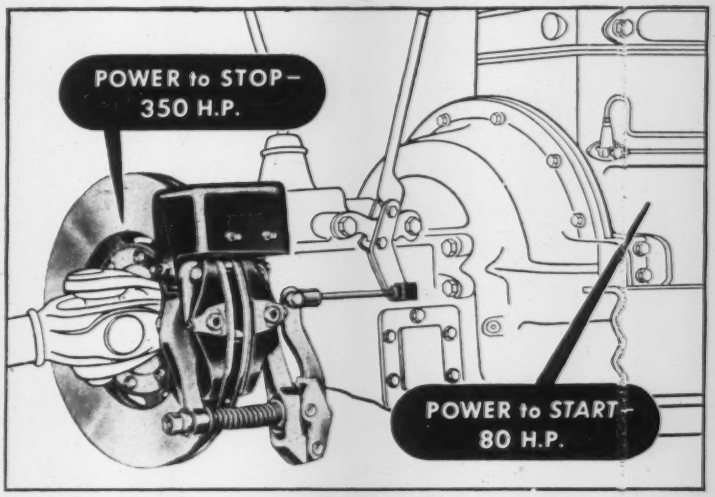
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

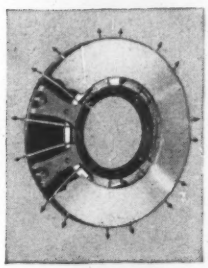
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

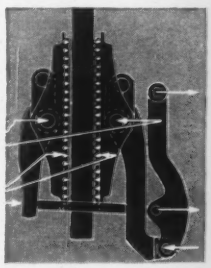


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

- Motor cranes
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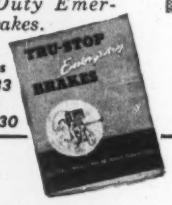
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for

Catalogs DH-33 and DH-530



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ACCO

TRADE MARK

Lima Roadpacker owned by N. H. Garman & Bros., Inc., Reading, Pa. Shown working on highway widening job on U. S. 22, near Harrisburg, Pa. Work involved widening outer strips of 4-lane highway by 33-in. The trench, 9-in. deep, was first lined with a 1½-in. cushion course of screenings. The entire 9-in. lift of 4-in. stone was then tightly keyed in two passes of the Roadpacker. It took only two applications of dry screenings to fill the voids.

"LIMA ROADPACKER DOES GREAT JOB"

says H. S. Garman

"We were looking for a better compactor," says Harold S. Garman of N. H. Garman & Bros., Inc., paving contractors of Reading, Pa., "and we really found it in the Lima Roadpacker. Before we made the purchase, we tried out the other leading makes. The Roadpacker proved to be the fastest machine of the lot, and did a better job of compacting to the state's tough specs. On one job we compacted to 97% of the solid rock weight.

"To get real speed on the job (picture above) we used the widening attachment, which permits two shoes to be hooked up one behind the other. This was very successful and allowed us to finish the operation in record time. Recently, using the complete set of six shoes, we set what we think might be another record when we compacted over 2200 tons of aggregate in an 8-hr. shift. For my money, the Lima Roadpacker does a great job."

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Unit Prices

Alternate Reservoir Roof Bids in California

Alternate bids on two types of concrete roofs—poured-in-place and precast, pre-stressed—featured the bidding on the 177'x210'x14', 3 million gal Langden Reservoir in San Marino, Calif. The bids on this 36,000 sq ft roof ranged from $2.39-$3.33 sq ft for the poured roof, and $2.61-$2.99 for the precast. His low bid for the poured roof won this $184,675 reservoir contract for Job Concrete Construction Corp., Pomona, Calif. He furnishes all materials except water.

Depth of the reservoir is limited to 14 ft by Planning Commission requirements and existing pipelines.

Sloping linings and floor slabs are 3000 lb concrete, walls 2000 lb and roof 3000 lb (light weight) concrete.

Prevailing wages include: skilled $3.47; semi-skilled $2.96; common labor $2.50; carpenters $3.22; heavy equipment operators $3.56.

Bidding went like this:

Poured Concrete Roof

IC	Job Conc Construction Corp., Pomona, Calif.	$184,675
2	Ammaco & F. W. Case, Van Nuys, Calif	204,810
4	Milburn Construction Co., LaVerne, Calif	247,807
EE	Frank Alderman, So. Pasadena, Calif	217,573

Bids: 9-10-57 Items	Unit	Quantity	Unit Prices 1 C	2
Reservoir exc	cy	10,420	$0.52	$2.50
Embankment const	cy	9,000	0.46	1.00
Drain tile, 4"	lf	1,160	1.37	2.00
VC drain, 4"	lf	264	1.40	1.10
6" intake	lf	229	4.67	5.00
8"	lf	295	5.16	4.40
10"	lf	212	6.41	5.00
Drain rock	lf	318	5.77	4.00
Drain lines, 12" inlet & overflow	lf	338	16.23	19.00
Outlet line, 20"	lf	290	27.18	32.00
Pumpline relocate exist 18" stl	lf	228	19.16	12.00
16" & 18"	lf	20	63.31	34.00
Manholes & catch basins	ls	job	1,998	2,300
Plant mix surf on slope	t	253	17.55	17.00
floor	t	312	13.75	12.00
Imperv membrane	sf	37,388	0.11	0.10
Conc slope lining, reinf	cy	205	42.72	62.00
floor slab, reinf	cy	250	37.53	36.00
Elast jt sealer	lf	4,688	0.31	0.30
Conc, column ftg	cy	84	52.16	34.00
wall & ftg	cy	578	36.18	40.00
reservoir roof, poured	cy	833	84.14	73.00
Bumpers & roof flashing, rubber	ls	job	9,940	8,000
Valves: 20" butterfly	ls	job	3,550	3,600
12" float	ls	job	1,298	2,300
24" check	ls	job	2,160	2,600
12" flood gate	ea	2	310.00	420.00
Gage & float switch water level	ls	job	953.00	670.00
Retaining wall	sf	280	2.22	5.00
AC wearing crse, 1½"	t	50	10.16	13.00

Completion schedule: 9-18-57 to 5-15-58
Liquidated damages: $100/day

Alternate bids for reservoir with a precast, pre-stressed roof were as follows:

1	Beardco Construction Co., Whittier, Calif.	$210,577
2	Ben Fallgren, Los Angeles, Calif.	212,678
3	Ammaco & F. W. Case, Van Nuys, Calif.	216,794
EE	Frank Alderman, So. Pasadena, Calif.	176,453

Bids: 9-10-57 Items	Unit	Quantity	Unit Prices 1	2
Precast Concrete Roof				
Concrete column footings	cy	35	$94.00	$72.11
walls & fittings	cy	400	86.50	57.27
reservoir roof	cy	467	49.00	146.86

Water and Sewer Main Job For Wisconsin Subdivision

A water and sewer main job for Cudahy, Wis. was won by Tomaro Contractors, Inc. of Cudahy on a price of $316,580 for the tunnel sewer—7.1% below the competing bid but 7.3% above the estimate of the engineer, James J. Tiry, Director of Public Works, Cudahy. Only Tomaro bid on the open cut alternate.

Work will be in newly subdivided areas with a few streets. Wellpoints are required along the 18 in. and 21 in. dia sewers. The 8 in. dia sanitary sewer is to be laid along an easement area containing driveways and walks, trees, bushes, grass, etc. The unit price for the 12 in. dia water main includes encasement in sand filled culvert jacked under a railroad crossing. It includes two manholes.

The city furnishes hydrants and auxiliary valves; the contractor supplies all other material. The site is accessible by truck or rail. Cast iron pipe is 150 ASA 21.6-1953, and ASA 21.11; fittings 250 ASA 21.10 and ASA 21.11.

Wages prevailing in the area include: tractor and shovel operators $3.34; carpenters $3.44; common labor $2.66, all including fringe benefits.

This is how the bidding went.

1C Tomaro Contractors, Inc., Cudahy, Wis.	$316,580
Contract (sewer tunnel)	
Alternate open cut sewer	306,951
2 R-W Construction Co., Milwaukee, Wis.	340,683
EE James J. Tiry, Dir. of Public Wks, Cudahy	295,000

Bids: 7-26-57 Items	Unit	Quantity	Unit Prices 1C	2
San sewer, VTP 21", tunnel ES 18", ground bkfl and gravel	lf	935	$98.00	$95.00
8" ground bkfl	lf	390	60.00	50.00
gravel	lf	4,900	6.75	12.50
MH, std 3'-6"ϕ, over 12'	ea	5,010	6.90	8.80
under 12'	ea	1	2,000	1,200
OD, 3'-6"ϕ, under 12'	ea	47	275.00	257.00
Conn to existing MH, 6" OD	ea	2	2000	850.00
San sewer lats, VTP 8", 30'	ea	1	600.00	240.00
50'	ea	123	150.00	180.00
Watermain, CIP 8", grvl	lf	4	250.00	300.00
ground bkfl	lf	910	8.00	8.40
6", grvl	lf	1,325	7.00	7.00
ground bkfl	lf	4,420	7.00	7.50
Hydrant lead, CIP 6"	lf	220	6.50	6.40
and valve, set	ea	169	6.75	9.40
Water lats, copper ¾", 22'	ea	11	60.00	75.00
38'	ea	58	100.00	60.00
2", 80'	ea	89	125.00	90.00
Watermain, CIP 12", grvl	ea	1	500.00	150.00
Storm sewer, CSP 8", grvl	lf	1,050	20.00	15.60
RCSP 18", grvl	lf	130	6.00	7.00
21", grvl	lf	540	10.00	11.00
MH, std storm, 3'-6"ϕ	lf	25	12.00	12.00
	ea	6	300.00	200.00

The bids for an open cut alternate sewer were:

Bids: 7-26-57 Items	Unit	Quantity	Unit Prices 1
San sewer, open cut, VTP 21"ϕ	lf	935	90.00
8" ground bkfl	lf	4,515	6.75
MH, std 3'-6"ϕ	ea	45	275.00
Riser conn, 6"	vf	80	20.00

vf vertical ft
Work started Aug. 15. Completion: 180 days.

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Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES

- Cement, Aggregate, Ready-mixed Concrete, Asphalt: Last, Dec. 5; Next, Jan. 9
- Iron and Steel Products, Pipe: Last, Dec. 12; Next, Jan. 16
- Wood Products, Glass, Explosives, Chemicals: Last, Dec. 19; Next Jan. 23
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Dec. 26; Next, Jan. 30

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ½"	⅝"	GYPSUM BOARD LATH plain or perf per Msq ft ⅜" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	½" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft ½"	MINERAL WOOL INSULATION loose, per 40-lb bag a	3" batts per M sf a	GLASS FIBER INSULATION loose, per 40-lb bag a	3" batts per M sf a	ALUMINUM FOIL 60¢ Kraft 1 side foil per roll of 250 s. f.	Expansible Blanket 2 layers foil per Msq. ft
Atlanta	$70.00	$80.00	$43.50	$70.00	$70.00	$127.00	$70.00	$1.00	$60.00	$2.00[b]	$75.00	.....	.....
Baltimore	51.25[f]	44.75[f]	32.55[f]	55.00[f]	65.00[f]	108.50[f]	69.00[f]	1.30	66.50	1.50	45.00	$4.00[g]	$33.50
Birmingham	73.00	60.00	47.77	75.00	82.00	136.50	81.00	1.40	70.00	1.60	78.00	3.30[g]	.....
Boston	60.00[m]	50.00[m]	36.00[m]	60.00[m]	85.00[m]	120.00[m]	79.00[kn]	1.45	75.00	.....	65.00	5.30	52.50
Chicago	67.00	52.00	43.00	62.00	95.00	123.00	85.00	1.85	80.00[k]	.....	63/65[l]	5.25[g]	.....
Cincinnati	48.00[w]	42.85[w]	32.05[w]	51.16[w]	70.00[w]	125.00[w]	72.50[w]	1.30	63.00	1.30	76.50	3.12[j]	50.00
Cleveland	60.50	55.00	40.00	65.00	74.00	130.00	80.00	1.35/1.50	80.00	.....	55.00[o]	20.00[e]	60.00
Dallas	58.00	55.00	42.50	65.00	73.50	122.50	70.00	1.94	66.70	1.40	66.10	4.30[g]	.....
Denver	62.00	54.50	41.00	62.00	75.90	126.00	74.90	.....	71.00[u]	1.28[z]	60.00[a]	11.00[r]	21.00
Detroit	57.50	49.50	36.00	61.00	59.50	90.00	59.00	.....	.....	1.95[b]	88.00	.....	.....
Kansas City	65.80	55.00	40.00	.....	72.00	115.00	75.00	1.40	75.00	2.00	75.00	4.11[d]	.....[ty]
Los Angeles	64.00	59.00	0.33[z]	66.50	71.87	121.25	80.00	.....	83.00	1.35[z]	64.00	4.40[g]	.....
Minneapolis	75.00	65.00	0.40[z]	80.00	78.00	140.00	78.00	2.00	80.00	1.80	80.00	5.50	.....
Montreal	56.00	47.40	36/39	53.00	63.25	.....	63.00	1.50	66.00	1.50	66.00	9.00[q]	56.00
New Orleans	57.00	48.00	45.00	60.00	75.00	125.00	72.50	1.75	65.00[o]	.....	.....	.....	.....
New York	53.25	45.75	35.25	54.25	71.00	117.00	72.50	1.55[b]	68.50	1.55[b]	68.50	4.05[i]	52.50[e]
Philadelphia	50/55	48/53	34/40	49/54	68/73	105/110	55/65	.....	60/70	.....	70/75	5.60/6.34	40/50
Pittsburgh	.....	47.50	35.00	.....	60.00	100.00	55.00	1.05[z]	55.00[z]	1.05[z]	55.00[z]	2.75[i]	38.50
St. Louis	65.00	55.00	39.00	70.00	75.00	120.00	80.00	1.35	85.00	1.65	70.00	4.50[k]	.....
San Francisco	55.00	46.50	0.35[z]	58.00	68.00	109.00	67.00	1.60	66.50	1.60	66.50	4.95	55.00
Seattle	66.00	56.90	49.45	65.00	74.50	125.00	73.50	1.60[t]	74.00	1.90[o]p	50.00[o]l	4.25	46.80
Toronto	61.00	50.00	38.00	64.50	75.00	.....	.....	1.40	60.00	.....	60.00	16.50[e]	45.45

** F.o.b. warehouse. [a] Semi thick. [b] 30¢ bag. [c] 12' to 24' width. [d] 40¢ kraft paper, 5 Msf, 100/500 rolls. [e] 20¢ sq ft bag, 4' thick. [f] Full trailer loads. [g] 80¢ kraft paper backing. [h] LCL. [i] 40¢. [j] 80¢. [k] 7'. [l] 2'. [m] 10 ton quantities. [n] Distributor's siding. [o] Per Msf roll. [p] 32¢ bag. [q] 500 sf. [r] Per cwt. [s] 35¢ bag. [t] 26¢ bag. [u] Flame proof $75. [w] F.o.b. city. [x] Sq yd. [y] Temporarily off market

HOURLY WAGE RATES—Base rate + fringe benefits

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Electrical Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Common Labor Heavy Cons
Atlanta	$3.45	$2.90	$3.15+7½[d]	$3.225	$3.125	$3.30+7¢[e]	$3.30+25¢[d]	$1.55	$1.55
Baltimore	3.80+10¢[d]	3.05+7½[d]	3.75+7½[d]	3.55/3.70+10¢[g]	3.35+7½[e]	3.425+7½[e]i	3.30+7½[d]	1.90+7½[e]	1.90+7½[e]
Birmingham	3.65	2.85	3.20+10¢[c]	2.65[c]	3.05	3.30	3.32+10¢[c]	1.65	1.75
Boston	3.65+15¢[d]	3.25+10¢[d]	3.70+20¢[e]	3.65+10¢[l]	3.65+20¢	3.55+12¢[g]	3.35+25¢[d]	2.45+7¢[d]	2.35+7¢[d]
Chicago	3.82½+7½[e]	3.45+20¢[e]	3.80+15¢[e]	3.40+5¢[c]	3.70+23¢[e]	3.65+22¢[e]	3.55+22¢[e,o]	2.77½+7½[e]	2.77½+7½[e]
Cincinnati	3.75	3.45	3.50+7½[d]	3.225/3.475	3.50	3.67+4¢[N]	3.65+9½[e]	2.50	2.40
Cleveland	3.715+10¢[i]	3.74	3.64+10¢[c]	3.74	3.74	3.765	3.64+10¢[d]	3.00	2.915
Dallas	3.775	3.10	3.175+7½[c]	3.20	3.50½+10¢[c]	3.25+7½[c]	3.25+7½[c]	1.62½	1.62½
Denver	3.75	3.20	3.125+7½[d]	2.95	3.375+12½[e,kk]	3.40[f]	3.35+15¢[D]	2.10	2.10
Detroit	3.53+38¢[H]	3.25+40¢[e]	3.60+22½[e,f]	3.20+20¢[e]	3.5+34¢[e,r]	3.65+34½[e,f]	3.63+14¢[g]	2.5×+25¢[e]	2.5×+25¢[e]
Kansas City	3.75	3.125	3.25	3.22	3.50	3.475[f]	3.40+9¢[W]	2.255	2.305
Los Angeles	3.80+10¢[hh]	3.22½+10¢[d]	3.625+10¢[c]	3.10+10¢[d]	3.94+15¢[d]	3.90[f]	3.70+10¢[T]	2.50+7½[c]	2.50+7½[c]
Minneapolis	3.575	3.15	3.32	3.10	3.25+23¢[g]	3.25+36¢[n]	3.215+20¢[e]	2.40	2.40
New Orleans	3.425+5¢[s]	2.90	3.20+7½[c]	3.025+7½[c]	2.985+5¢[c]	3.275+7½[c]	3.25+15¢[s]	1.65	1.65
New York	4.25+37¢[hr]	3.90+31¢[hJ]	4.30+36¢[p]	4.15+33¢[cc]	4.15+50¢[q]	3.65+40¢[rr]	4.10+41¢[hL]	2.80+22¢[V]	2.80+22¢[V]
Philadelphia	3.75+17¢[r]	3.535	4.05+18¢[M]	3.20½/3.95½+10¢[r]	3.90+15¢[r]	4.07½+16¢[w]	4.00+16¢[r]	2.25	2.55
Pittsburgh	3.95+17½[em]	3.525+7½[c]	3.80+10¢[d]	3.42+10¢[d]	3.575+17½[em]	4.00+28¢[d]	3.775+17½[em]	2.325+17½[em]	2.20+15¢[rr]
St. Louis	3.90+2½[je]	3.45+10¢[c]	3.475+7½[c]	3.55[f]	3.80+7½[c]	3.83+29¢[c]	3.80+20¢[c]	2.50+10¢[c]	2.50+10¢[c]
San Francisco	3.95+52½[dd]	3.175+30¢[f]	3.62½+10¢[c]	3.205+10¢[c]	3.69+39¢[w]	3.785+26¢[ll]	3.70+46¢[K]	2.505+10¢[c]	2.505+10¢[c]
Seattle	3.75+10¢[d]	2.94+10¢[d]	3.25+10¢[d]	3.13+20¢[e]	3.40+10¢[d]	3.40+21½¢[T]	3.40+23¢[T]	2.51+10¢[d]	2.51+10¢[d]
Montreal	2.20+5¢[t]	2.00+4¢[t]	2.15+5¢[t]	1.90+4¢[t]	2.22+5¢[t]	2.20+5¢[t]	2.20+5¢[t]	1.40+3¢[t]	1.40+3¢[t]
Toronto	2.76+11¢[t]	2.50+10¢[t]	2.50+10¢[t]	2.60+10¢[t]	2.60+20¢[t]	2.80+11¢[t]	2.49+16¢[t]	1.55+6¢[t]	1.55+6¢[t]

ENR Skilled Average (Bricklayers, Carpenters, Iron workers): $3.594. ENR Common Average $2.334.

* Cost of living bonus incl. in base pay. † FB [a] 6 hr. day. [b] 7 hr. day. [c] 5% vac. stamp fund plus 10¢ WF for bricklayers; 4% VF for electricians plus 8¢ WF, 1% PF. [d] H & WF. [e] 10¢ H & W, 10¢ VF. [f] 10¢ H & W, 10¢ PF, 10¢ VF. [g] $2.85 homes & housing plus 7½¢ WF. [h] WF. [i] Inc. 4% VF; 1% PF ad by employer. [j] 10¢ WF, 5¢ VP, 5¢ HP. [k] 4% VF. [m] 7½¢ WF, 10¢ PF. [n] 7% V & Hol. 3% H & W, 1% PF. [o] 10¢ WF, 10¢ PF. [p] 3% WF, 3% PF + 10¢ in lieu of pd. hol. [q] 10¢ WF, 6% V & H, 3% PF. [r] 4% WF, 20¢ PF. [s] 5% W & PF, 4% VF, 1% NC, 1% JI, plus 6 PH. [t] Inc. 10¢ WF. [u] 10¢ WF, 1% PF, ½% apprent. [v] 1 drum; 2 drums, 2.80. [w] 15¢ WF, 15¢ VF. [x] 2% VF. [y] 10¢ H & W, 10¢ PF. [z] 10¢ WF, 5¢ HP. [A] 15¢ WF, 15¢ PF, 20¢ BF. [B] 7½¢ VP, 5¢ PF, 1½¢ Ed. F. [C] 9¢ H & W & Ins., 7% V & H. [D] 10¢ H & WF, 5¢ indus. prom. [E] 6% WF, plus travel pay per day. [F] Plus $4 per day annuity contrib. [G] 10¢ WF, 10¢ VF, 3¢ prom. [H] 10¢ WF, 10¢ VP, 3% PF, 2% PH. [I] 15¢ H & WF, 5¢ advtg. [J] 5% WF, 6 PH, 3% PF. [K] 25¢ W & PF, 15¢ VF, plus 6¢ misc. [L] 3% WF, 3% PF, 3% VF, 1% Ed. F. [M] 10½¢ WF, 7½¢ PF. [N] 10% PF. [O] 10¢ WF, 1% NECA. [P] 10¢ H Ins., 7½¢ PF, 5¢ VF. [Q] 2 drums; 1 drum $2.85/3.00 + 10¢ WF. [R] 10¢ H & WF, 2¢ admin. 1¢ apprent. [S] 10¢ H & WF, 15¢ PF. [T] H & W, VF. [U] 10¢ WF, 13¢ VF, 3¢ PF. [V] 8% WF, 3% PF. [W] 7½¢ WF, 1½¢ Ed. F. [X] 7½¢ WF, 14¢ VF. [aa] 7¢ WF, 15¢ PF. [bb] 8¢ WF, 2¢ advg. [dd] 17½¢ WF, 20¢ PF, 10¢ PH, 5¢ Jt Bd. [ff] 10¢ H & W, 5¢ PF. [gg] 10¢ ins. [hh] 7½¢ H & WF, 5¢ indus. prom. [ii] 4% WF, 4% PF, 6 PH.

	Truck drivers 1½ T	Truck drivers —4 cy	Truck drivers +4 cy	Tractor Operators Incl. bulldozers 34-49 hp	Tractor Operators Incl. bulldozers 70-100 hp	Tractor Operators Incl. bulldozers 100 & over	Tractor scraper 15-16 cy	Power cranes & shovels ½ cy	Power cranes & shovels ¾ cy	Motor grader oper	Air comp oper	Air tool oper
Atlanta	$1.70	$1.80	$2.05	$2.70	$2.70	$2.70	$2.70	$3.225	$3.225	$2.70	$2.475	$1.77
Baltimore	1.90+7½[e]	1.90+7½[e]	2.00+7½[ehh]	3.15/3.30 +10¢[eh]	3.15/3.30 +10¢[eh]	3.15/3.30 +10¢[eh]	3.15/3.30 +10¢[eh]	3.55/3.70 +10¢[eh]	3.55/3.70 +10¢[eh]	3.15/3.30 +10¢[eh]	2.85/3.00 +10¢[eh]	2.00+7½[e]
Birmingham	1.73	1.92[ff]	2.18[ee]	2.79	2.79	2.79	2.93	2.93	2.93	2.89	2.52	1.90
Boston	2.395[c]	.....[c]	.....[c]	3.275+10¢[ed]	3.275+10¢[ed]	3.275+10¢[ed]	3.275+10¢[ed]	3.65+10¢[e]	3.65+10¢[e]	3.275+10¢[e]	3.20+10¢[e]	2.60+7¢[ee]
Chicago	2.16+12¢[fe]	.....	.....	3.15+5¢[e]	3.30+5¢[e]	3.20+5¢[e]	3.00+5¢[e]	3.75+5¢[e]	3.75+5¢[e]	3.25+5¢[e]	3.10+5¢[e]	.....
Cincinnati	2.33[ee]	2.43[ee]	2.53[ee]	3.225	3.225	3.225	3.225	3.475	3.475	3.475	3.475	3.490
Cleveland	2.625+10¢[e]	2.625+10¢[e]	2.625+10¢[e]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.00[f]	1.775/2.00[f]
Dallas	1.625	1.625	1.625/2.625[f]	2.20	2.30	2.45	2.90	2.95	2.95	2.80	2.80	2.40
Denver	2.20	2.30	2.45	3.50+10¢[e]	3.50+10¢[e]	3.50+10¢[e]	3.50+10¢[e]	3.50+10¢[e]	3.50+10¢[e]	3.50+10¢[e]	3.225+10¢[e]	2.71+25¢[mm]
Detroit	2.61	2.61	2.61	2.425	2.975[e]	2.975[e]	2.975[e]	3.22	3.22	2.835	2.975[f]	2.35
Kansas City	2.23[e]	2.23[e]	2.305[e]	3.47+10¢[e]	3.47+10¢[e]	3.47+10¢[e]	3.56+10¢[e]	3.56+10¢[e]	3.56+10¢[e]	3.56+10¢[e]	2.74+10¢[e]	2.71+7½[e]
Los Angeles	2.63+7½[e]	2.63+7½[e]	2.83+7½[e]	2.78	3.00[v]		3.00	3.22[y]	3.48[z]	2.78	2.67	2.53
Minneapolis	2.40	2.40[e]	2.55[e]	2.375+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	2.375+7½[e]	1.75
New Orleans	1.80	2.05	2.05	3.525+25¢[h]	3.525+25¢[h]	3.525+25¢[h]	3.65+29¢[k]	4.40+35¢[k]	4.40+35¢[k]	3.65+29¢[h]	3.65+29¢[kk]	3.25+16¢[ee]
New York	2.21+22½[cc]	2.75+14¢[hh]	2.75+14¢[hh]	——3.20½/3.95½+10¢[e]——			3.20½/3.95½ +10¢[e]	——3.20½/3.95½+10¢[e]——		3.20½/3.95½ +10¢[e]	3.20+10¢[e]	2.25+10¢[e]
Philadelphia	——2.215/2.35+12½[ec]——											
Pittsburgh	2.27+15¢[m]	2.40+15¢[m]	2.50+15¢[m]	3.23+10¢[e]	3.23+10¢[e]	3.23+10¢[e]	3.23+10¢[e]	3.42+10¢[e]	3.42+10¢[e]	3.42+10¢[e]	3.06½/3.60[e]	2.25+15¢[m]
St. Louis	2.75+7½[eo]	2.65+7½[e]	2.65+7½[e]	3.55[kk]	3.55[kk]	3.55[kk]	3.55[kk]	3.55[kk]	3.55[kk]	3.55[kk]	3.00[kk]	3.00[kk]
San Francisco	2.55+10¢[e]	2.55+10¢[e]	2.69+10¢[e]	3.32+10¢[e]	3.32+10¢[e]	3.32+10¢[e]	3.32+10¢[e]	3.65+10¢[e]	3.65+10¢[e]	3.48+10¢[e]	2.93+10¢[e]	2.755+10¢[e]
Seattle	2.80+17½[ee]	2.80+17½[ddz]	3.00+17½[eee]	3.10+20¢[ff]	3.10+20¢[ff]	3.10+20¢[ff]	3.10+20¢[ff]	3.46+20¢[ff]	3.46+20¢[ff]	3.19+20¢[ff]	2.85+20¢[ff]	2.71+10¢[e]
Montreal	1.40+3¢[ll]	1.40+3¢[ll]	1.40+3¢[ll]	1.60+11¢[ll]	1.83+4¢[ll]	1.83+4¢[ll]	1.83+4¢[ll]	2.09+5¢[ll]	2.09+5¢[ll]	1.83+4¢[ll]	1.70+4¢[ll]	1.70+4¢[ll]
Toronto	1.60+6¢[ii]	1.60+6¢[ii]	1.60+6¢[ii]	2.00+8¢[ii]	2.10+8¢[ii]	2.10+8¢[ii]	2.10+8¢[ii]	2.60+10¢[ii]	2.60+10¢[ii]	.....	2.15+9¢[ii]	2.15+9¢[ii]

[a] H & WF. [b] lower rates, straight time; other broken. [c] 2-axle; 10 wh. 3 axle $2.45; Euclid $2.65. [d] intermediate. [e] bldg contr.; highway $2.45+7¢ WF. [f] less than 2-T. [g] up 6 cy. [h] 4% WF, 4% PF. [i] 6-8 cy. [j] plus $2 pd by employer for hosp. death benefits to family. [k] bldg constr; steel contr $3.475. [l] higher rates are union, other taken from min. wage approved by County Comm. Court. [m] 10¢ H & W, 5¢ PF. [n] flatbed. [o] under 10 cy. [p] over 10 cy. [q] over 50 hp. [r] blade grader. [s] WF. [t] single. [u] incl. 10¢ H & W. [v] incl. 7½¢ H & W. [w] 7½¢ H & W. 5¢ PF. [x] 7½¢ WF, 10¢ PF. [y] to 3½ cy. [z] 3½ cy & over. [aa] plus W & PF. [bb] 3% WF, 2% PF; plus 11 PH. [cc] 11¢ WF, 11½¢ PF, 11 PH. [dd] up to 5 cy. [ee] 5 cy & over. [ff] If 1½ to 3 T. [gg] up to 5 T; 5 T & over, 2.25. [hh] 5¢ H & WF, 2½¢ PF. [ii] 4% VF. [kk] Incl. 10¢ WF. [ll] Revised, Effective Mar. 1, 1957 incl. 2% VF [mm] 10¢ H & WF, 10¢ ins. 5¢ VP. [oo] Plus $2.25 wk. WF. [ss] 8% WF, plus 6 PH. [tt] 10¢ H & WF, 10¢ PF.

MEXICO CITY PRICES

In Pesos, F.o.b. City		Nov. '57	Dec. '57
Common Wages—Building (8 hr. day) (Peons)	av. per hr.	1.50	1.50
Common Wages—Heavy Const. (8 hr. day) (Peons)	av. per hr.	1.86	1.86
Skilled Labor Wages			
Carpenters (8 hr. day) 1 cl.	av. per hr.	3.10	3.10
Bricklayers (8 hr. day) 1 cl.	av. per hr.	2.50	2.50
Struct. Iron Workers (8 hr. day) Remachadores	av. per hr.	3.77	3.77

		Nov. '57	Dec. '57
Struct. Steel, Shapet 3"–15" x 12 meters	per metric ton	2100.00#	2300.00#
# fob Monterrey			
Reinf. Steel, Corr. Rods ½" x 11 meters	per ton	2000.00	2000.00
⅝" x 11 meters	per ton	2000.00	2000.00
¾" x 11 meters	per ton	2000.00	2000.00
⅞" x 11 meters	per ton	2000.00	2000.00
1" x 11 meters	per ton	2000.00	2000.00

		Nov. '57	Dec. '57
Gravel truck load at 3½ cu. meters			
Blue Gravel	per tr. load	75.00	75.00
Rose Gravel	per tr. load	65.00	65.00
Cement, Std. Port. (Tolteca)	per tan	240.00	240.00
Lumber			
1" Pine	per M ft.	1700.00	1700.00
1½" Pine	per M ft.	1900.00	1900.00

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

January 6 Connecticut January 14 Massachusetts

▲† Mass., Bedford—SCIENCES LABORATORY—BA 1/7—U. S. Eng., 150 Causeway St., Boston, Mass., interior constr. of Sciences Laboratory, Cambridge Research Laboratory-Laurence G. Hanscom Field. $1,250,000-$1,500,000. Plans deposit $10. Extended date. CD 12/2.

BUILDINGS—BA

▲ Mass., Lowell—INDUSTRIAL RESEARCH—BA 1/24—State, Dpt. Educ., c/o Div. Bldg. Constr., 38 Chaucy St., Boston, E-812, industrial research bldg. at Lowell Technical Institute. $1,655,000. Plans deposit $100. Krokyn & Browne, 184 Boylston St., Boston, archts. W. Chester Browne & Assoc. Inc., 184 Boylston St., Boston, Mass., mechanical and structural engr. CD 1/6/56.

HEAVY CONSTRUCTION—LB & CA

▲ MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Bayer & Mingolla Constr. Co., Inc., P. O. Box 991, Worcester, Mass., CA $1,021,977, est. $1,166,685, relocation Section Rte. 2, FAPF-348(3), Erving, Orange and Wendell. Bids Dec. 10. CD 12/12, under LB.

▲† U. S. Eng., 111 E. 16th St., New York 3, N. Y., cancelled bids to have been opened about Dec. 19, Unit 4, Part 1, constr. approx. 1,000 lin. ft. concrete wall, concrete chute, 12 drainage structures and excav. approx. 1,100 lin. ft. channel, North Adams, MASSACHUSETTS. $1,000,000-$5,000,000. Will re-advertise. CD 10/29.

▲ C. J. Maney Co., Inc., 173 Bedford St., Lexington, Mass., LB $1,688,000, est. $1,500,000, Base Bid, Bid Type "A", build and lease (3 yr. basis) Off-Street Parking Garage, Bedford, Kingston and Columbia Sts., BOSTON, MASS. City, Real Property Dpt., City Hall Annex, Boston, Mass. Bids Dec. 19. CD 11/13.

BUILDINGS—LB & CA

▲ John Capobianco, 101 Tremont St., Boston, Mass., LB $1,899,000, SURGICAL WING addn. to City Hospital, Whitewell St., QUINCY, MASS. City, Hospital Dpt., Mayor's Office, City Hall, Quincy, Mass. Bids Dec. 20. CD 12/3.

▲ Frouge Constr. Co., Inc., 141 North Ave., Bridgeport, Conn., CA $1,869,000, Contr. PHA No. Conn 20-1, Low Rent HOUSING, incl. 10 bldgs. and sewer pumping station addn., DANBURY, CONN. Danbury Housing Auth., Lake Ave. exten., Danbury, Conn. Bids Nov. 14, awarded Dec. 19. CD 11/20, under LB.

▲ Wadhams & May Co., 15 Lewis St., Hartford, Conn., CA $1,410,579, Proj. Conn. 49, 98 beds, incl. 4th floor HOSPITAL EXPANSION, MANCHESTER, CONN. Manchester Memorial Hospital, 71 Haynes St., Manchester, Conn. Bids Dec. 12. CD 12/17, under LB.

▲ Wexler Constr. Co., Inc., 1118 Needham St., Newton Highlands, Mass., LB $1,885,000 (13 bidders) Moderate Rental HOUSING, WATERBURY, CONN. Waterbury Housing Auth., 156 Hars Circle, Waterbury, Conn. CD 2/11.

▲ Spring Park, West St., Windsor Locks, Conn. Owner Builds. CA $2,212,650, 135 HOUSES "Spring Park" West St., WINDSOR LOCKS, CONN. CD 10/10.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

January 7 New Jersey January 21 Maryland

BUILDINGS—BA

▲ N. J., Camden—HOSPITAL—BA 1/7—West Jersey Hospital, Mount Ephraim and Atlantic Aves., 2 wing hospital addn. $2,000,000. Rosengarten & Kramer, 10 S. 18 St., Phila., Pa., engrs. George Vonriffel, Jr., 30 Warwick Rd., Haddonfield, archt. CD 12/19.

▲† N. Y., Bellmore—SHOP, etc.—BA On Or About 1/28—U. S. Eng., 111 E. 16 St., New York, Zone 3, ordnance field maintenance shop addn. and multi-purpose bldg., Serial No. ENG-30-075-58-128.

▲ Pa., Mercer—SCHOOL—BA 1/30—Pa. Pub. School Bldg. Auth., 101 S. 25 St., Harrisburg, secondary school for Hickory Twp. School Dist. $1,500,000. Plans deposit $35. Kling & Frost, 661 Wick Ave., Youngstown, O., archts. CD 11/22, under LB.

HEAVY CONSTRUCTION—LB & CA

▲ PENNSYLVANIA—Pa. Hy. & Bridge Auth., 506 North Office Bldg., Harrisburg, Bids opened 12/20,
Pa.—J. Richard Nissley, Inc., Landisville, Pa. LB $1,762,619 (14 bidders) 7,094 ft. aggreg. base with bit. surf. 24 ft. wide, 1 plate girder bridge one 18 ft. span concrete deck-I-beam bridge T. R. 405 Clinton and Muncy Creeks Twps., Lycoming Co.;
Pa.—Herbert R. Imbt, Inc., Box 138, State College, Pa. LB $844,275, 34,807 ft. course aggreg. base with bit. surf. variable in width, 3 bridges T. R. 6 Hamlin Twp., Mount Jewett Boro, McKean Co. CD 11/29.

BUILDINGS—LB & CA

▲ Jericho Park Homes, c/o Lane Realty, 107-40 Queens Blvd., Forest Hills, L. I., N. Y., Owner Builds, $3,000,000. 127 HOMES on south side of Jericho Turnpike, east of Broadway, JERICHO, N. Y.

▲ John W. Cowper Co., Sidway Bldg., Buffalo, 3, N. Y., CA Est. $2,500,000. 220,000 sq. ft. main Wheatfield PLANT addn., at east end of existing plant, NIAGARA FALLS, N. Y. Bell Aircraft Corp., Niagara Falls Blvd., Niagara Falls, N. Y. James W. Kideney & Assocs., 220 Delaware Ave., Buffalo, 2, N. Y., archts.

▲ Gerace & Castagna, Inc., 2110-A Northern Blvd., Manhasset, N. Y., LB $2,295,569 (7 bidders) 5 story HOSPITAL, Beach 51 St. and Rockaway Beach Blvd., ROCKAWAY BEACH, N. Y. Rockaway Beach Hospital, Beach 85 St., Rockaway Beach, N. Y. Bids Dec. 20. CD 11/29.

▲† B. J. Lucarelli & Co., 22 Orchard St., Jersey City, N. J., LB $1,905,000, LABORATORY, OFFICE BLDG., WAREHOUSE, BOILER PLANT and site work, PRINCETON, N. J. U. S. Atomic Energy Comn., 70 Columbus Ave., New York, N. Y. Bids Dec. 16, CD 12/12.

▲ Suburban Homes, c/o Michael S. Drialo, Allentown, N. J. Separate Contracts. $2,500,000. 185 unit RESIDENTAL DEVELOPMENT, Yardville-Allentown Rd., TRENTON, N. J. A. J. Lanning, 1100 S. Broad St., Trenton, N. J., archt.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

▲ H. B. Alexander & Son, 315 Vaughn St., Harrisburg, Pa. CA $1,486,500 general constr. HIGH SCHOOL, Carlisle Rd. south of Lemoyne, Lower Allen Twp., CAMP HILL, PA. West Shore Senior High School Auth., 7th and Walnut Sts., Lemoyne, Pa. Bids Nov. 14. CD 11/20, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 10 Alabama January 29 Louisiana

STREETS AND ROADS

January 8, 29 Louisiana January 10 Alabama

▲† LA., Shreveport—AIRPORT IMPRVS.—BA 2/11—U. S. Eng., 300 Broadway, Little Rock, Ark., airfield paving and lighting, Barksdale Air Force Base. $1,000,000-$5,000,000. CD 9/18.

BUILDINGS—BA

▲ Ky., Louisville—STORE—BA 1/20 (tentative Louisville Realty Co., 1414 Bardstown Rd., 7 story, rein.-con. approx. 136,000 sq. ft. store addn., Walnut St. between 3rd and 4th Sts. $1,500,000. Stewart Dry Goods, lessee E. T. Hutchins, Jarvis Lane, assoc. archt. Albert & Merkt & Co., 10 E. 40th St., New York, N. Y., engrs. CD 9/20.

HEAVY CONSTRUCTION—LB & CA

▲ VIRGINIA—Commonwealth of Va., Dpt. Hys., 1221 E. Broad St., Richmond,
Va.—Laramore Constr. Co., Inc., Box 348, Danville, Va. LB $502,506. (12 bidders) various soil aggreg. base bit. top and bridge 4.45 mi. Rte. 58, State Proj. 0058-041-012-031-033-020, Fed. Proj. F-FG-024-2 (1), Halifax Co.;
Va.—L. S. Abernathy & Co., Route 4, Glen Allen, Va. LB $82,543. (13 bidders), soil aggreg., bit. surf. tr. and bridges 0.78 mi. Rte. 648, State Proj. 0648-088-013-014, Fed. Proj. S-999 (1) Spotsylvania Co.,
Va.—E. F. Blankenship Co., 1308 W. Main St., Salem, Va. LB $525,653. (6 bidders), b. conc. and 2 bridges 1.63 mi. Rte. 220, State Proj. 0220-044-033-028, Fed. Proj. 1844-33-28-29-71, Henry Co. and City of Martinsville;
Va.—Adams Constr. Co., P.O. Box 60, Roanoke, Va. LB $403,845. (8 bidders), b. conc. 1.6 mi., State Proj. 0460-013-007, Fed. Proj. F-022-1 (4), Buchanan Co.;
Va.—E. W. Muller, Contractor, 7004 Park Dr., Newport News, Va. LB $145,442. (6 bidders), b. conc. wid'n. 0.68 mi. Rte. 60, State Proj. 0060-047-004, Fed. Proj. S-1013 (1), James City Co.;
Va.—W. H. Scott, Inc., Box 418, Franklin, Va. and E. V. Williams Co., Inc., 1269 E. Princess Anne Rd., Norfolk, Va. LB $1,803,885. (7 bidders) rein.-conc. 1.62 mi. Rte. 404 and 2 bridges, State Proj. 0404-135-071-072-073, Fed. Proj. I-122-1 (9), City of Warwick. Bids Dec. 18. CD 12/5.

▲ Sullivan, Long & Hagerty, 805 5th Ave. N., Birmingham, Ala. LB $1,568,847 Prop. A; $111,975 Prop. C; 54 in. outfall line sewer service lines, branch line and disposal plant HUNTSVILLE, ALA. Huntsville Water & Sewer Bd., City Hall, Huntsville, Ala. Bids Dec. 10, CD 11/23;
Watkins Constr. Co., 1705 Forrest Ave., Gadsden, Ala. LB $138,578, Prop. B (Huntsville, Ala.)

▲ LOUISIANA—State Dpt. Hys., R. B. Richardson, dir., Hy. Office Bldg., Baton Rouge, Bids opened 12/18,
La.—R. P. Farnsworth & Co., Inc., 1515 S. Salcedo, P. O. Box 850, New Orleans, La., LB $1,993,260 (2 bidders) grading, railroad underpass structure, c. conc. 0.307 mi. Airline Hy. Underpass, Rte. LA-US 61, SP No. 7-02-30, FAP No. U-194 (9), Jefferson Parish; LB $3,694,820 (2 bidders) c. conc. pavt., substructure, concrete deck, connecting ramps and other finishing work for elevated expressway structure and related work in connection therewith 0.555 mi. New Orleans approach to Mississippi River bridge (Pontchartrain Express), Rte. La 3027, SP No. 283-08-09, Contract No. 2, FAP No. I-In-524 (5), Orleans Parish;
La.—Southern Bridge Co., Box 1590, Dallas, Tex., LB $1,124,000, (2 bidders) grading, railroad underpass, c. conc. 1.184 mi. Texas Ave. North Market St. (Shreveport), SP No. 11-30-01, FAP No. U-68 (17), Caddo Parish;
La.—J. T. Richardson, Ruston, La., LB $195,173 aggreg. type or soil cement base course, bit. surf. treatment 9.829 mi. Holum-Rosefield Hy., Rte. LA 126, SP Nos. 41-05-08, 41-04-03 & 41-03-06, FASP No. S-539 (1), Caldwell, Lasalle and Catahoula Parishes;
La.—W. R. Aldrich & Co., 2493 Baywood Ave., Baton Rouge, La., LB $2,962,738, (2 bidders), grading, overpass and interchange structures, c. conc. 1.28 mi. Sulphur-Westlake Hy., Rte. La 3027 SP No. 740-00-16; FAP No. I-520 (5), Calcasieu Parish;
La.—W. R. Core, Box 785, Covington, La., LB $271,202 aggreg. type or soil cement base course, bit. surf. treatment 10.421 mi. Greenlaw-Mt. Hermon Hy., Rtes.

LA 1054 and LA 1055, SP Nos. 853-01-06 & 859-01-02, Tangipahoa and Washington Parishes;

La.—**T. W. Kleinpeter,** Box 4686, Audubon Sta., Baton Rouge, La., LB **$310,690,** aggreg. type or soil cement base course, bit. surf. treatment 7.595 mi. Frost-French Settlement Hy., Rte. LA 42, SP No. 261-01-07, Livingston Parish;

La.—**E. J. Courtney,** Amite, La., LB **$204,181,** aggreg. type or soil cement base course, bit. surf. treatment, 7.345 mi. Liverpool-Tangipahoa Hy., Rte. LA 440, SP Nos. 276-01-02 and 276-02-03, St. Helen and Tangipahoa Parishes. CD 12/11.

BUILDINGS—LB & CA

▲ **Frank Messer & Sons, Inc.,** 4612 Paddock, Cincinnati, O., LB **$3,378,800,** NEW WING to St. Mary's Hospital, HUNTINGTON, W. VA. Sisters of The Pallotine Missionary Society, St. Mary's Hospital, Huntington, W. Va. Vecellio & Kreps, Odd Fellows Bldg., Charleston, W. Va., archts. Bids Dec. 17. CD 12/10/57.

▲ **Daniel Constr. Co.,** 429 N. Main St., Greenville, S. C., CA Est. **$8,000,000** (with equip. $20,000,000) FIBRE GLASS PLANT, near SHELBY, N. C. Pittsburgh Plate Glass Co., Gateway Center Bldg., Pittsburgh, Pa. CD 2/4.

▲† **Phillips Constr. Co.,** 308 W. Palmer St., Charlotte, N. C. CA **$9,691,935.** 600 unit Capehart HOUSING with roads, paving and utilities Charleston Air Force Base, North Charleston, Inv. 49-605-58-ICH, CHARLESTON, S. C. U. S. Air Force, Military Air Transport Service, Charleston Air Force Base, North Charleston, S. C. Bids Nov. 14 CD 11/19 under LB.

▲ **A. R. Briggs Constr. Co.,** 526 Arch St., Macon, Ga., LB **$1,749,600,** CLASSROOM BLDG. for Georgia Tech, ATLANTA, GA. University System Bldg. Auth., 244 Washington St. S. W., Atlanta, Ga. Bids Dec. 17. CD 10/29.

▲ **Coite Somers Co.,** Box 111, Vidalia, Ga., CA **$2,308,000,** low rent HOUSING, GA. 1-6, AUGUSTA, GA. Augusta Housing Auth., 2100 Broad St., Augusta, Ga. Bids Nov. 26, awarded Dec. 16. CD 12/11, under LB.

▲ **Gervais F. Favrot Co., Inc.,** Baltimore Bldg., New Orleans, La., LB **$3,090,684,** 16 story Roosvelt MOTOR HOTEL and PARKING BLDG., Loyola and Gravier Sts., NEW ORLEANS, LA. Roosvelt Hotel, 123 Baronne St., New Orleans, La. Bids Dec. 17 CD 11/29.

▲ **Glenn Stevens,** 123 Parkway Dr., Covington, Ky. Owner Builds. **$3,000,000,** 300-HOME PROJECT on south side Florence, adjacent to US 42, FLORENCE, KY. James Vios, 22 Erlanger Ave., Erlanger, Ky., engr.

MIDDLE WEST

BUILDINGS—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 8 Michigan

STREETS AND ROADS

January 8 Michigan

BUILDINGS—BA

▲ **Ind., Indianapolis**—SERVICE CENTER—BA 1/9—L. S. Ayres & Co., Inc., Washington and Meridian St., structural steel for ft. 1 story, 541x639 structural steel frame and masonry service center, E, 23rd and Hillside St. Total est. $1,750,000. Lennox, Matthews, Simmons & Ford, 3949 Meadows Dr., engrs. archts.

▲ **Ill., Lombard**—SCHOOL—BA 1/14—School Dist. 87, 670 Crescent St., Glenn Ellyn, Glenbard East High School, gymnasium and auditorium, Main and Wilson Rd. $3,882,000. Nicol & Nicol, 23 E. Jackson Blvd. Chicago, archts. CD 10/5/56.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—Dpt. Hys., Columbus, Zone 15. Bids opened 12/10,

Rhoten Constr. Co., 16 E. Broad St., Columbus, O. LB **$2,142,000,** est. $2,142,000. Contr. 1-1105 (3) Type T-35 4.441 mi. and structures, Franklin Co. CD 12/2.

▲ **OHIO**—Dpt. Hys., George J. Thormyer, acting dir., Columbus, Zone 15, Bids opened 12/17,

O.—**V. N. Holderman & Sons, Inc.,** 390 Oakland Ave., Columbus, O., LB **$3,609,442,** est. $3,839,900. Contr. Ric 102061, 3.8 mi. Cincinnati-Conneaut Freeway, State Route 1, from just north of Charles Mill Reservoir, Richland Co. to just south of Ashland Co., 2 bridges will carry the Freeway over Black Fork of Mohican River and Ashland Co. Road 71, 2 other bridges one to carry Township Rd. 157 over the Freeway and other to carry Crider Road over Black Fork of Mohican River, Ashland and Richland Cos.; LB **$4,405,992,** est. $4,705,200, Contr. No. MRW1-1289, 5.5 mi. west of Chesterville northeast to near Johnsville Rd. about 5 mi. east of Mt. Gilead, a "diamond" type interchange constr. at State Rte. 95, twin bridges to carry the Freeway over branch of Kokosing River and Mt. Vernon Tiffin Rd. other bridges will carry State Route 95, Center Corners-Fredericktown Rd. Mt. Gilead-Fredericktown Rd. and State Route 314 over the Freeway, 4 lane divided highway will be constructed on 300 ft. wide right-of-way and will have 84 ft. median strip both inside and outside shoulders will be paved, Morrow Co.; LB **$4,924,618,** est. $5,374,700, 4.2 mi. section of Freeway State Route No. 1, from 1 mi. northeast of State Route 39 to just north of Charles Mill Reservoir connecting the Richland-Ashland Counties, the Richland segment is parallel to US 42, northeast of Mansfield, interchange will be constructed at relocated US 30, 2 bridges will carry the Freeway over relocated 30 and Crider Rd., and a single structure will carry existing US 30 over the Freeway, the 4 lane divided hy. constr. on 300 ft. wide right of way and have 84 ft. median strip, both inside and outside shoulders paved, Richland Co.;

O.—**Alleghany Contracting Industries, Inc.,** Pittsburgh, O., LB **$3,094,916,** est. $3,152,800, Contr. No. ATB 1-1583, 3.5 mi. section of Cincinnati-Conneaut Freeway State Route No. 1, east of Gageville to just east of Wright Rd. Freeway section is parallel to and about 2 mi. south of State Route 84, 4 lane divided highway will be built on 300 ft. wide right-of-way and have an 84 ft. median strip, both inside and outside shoulders will be paved, bridges will be constructed to carry the Freeway over Ashtabula River and to carry State Route 83 and Wright Rd. over the Freeway, Ashtabula Co.;

O.—**Philip Skinner,** Bethesda, O., LB **$165,457,** est. $167,500, Contr. BEL 40 (22.95-28.00) constr. new US 40—State Route 7 intersection in Bridgeport, proj. calls for curving US 40 slightly so that it will intersect with Route 7 in straight line with approach to Wheeling Island Bridge present intersection, which requires 2 right angle turns, minimum paving width 48 ft. widening in some places to as much as 56 ft., Belmont Co.;

O.—**National Engineering & Contracting Co.,** 1968 W. 3rd St., Cleveland, O., LB **$1,407,561,** est. $1,937,400 Contr. No. CUY 17-2095, constr. new Granger-Libby Viaduct over Pennsylvania and Wheeling & Lake Erie (Nickel Plate) railroads and Mill Creek and Greenhurst Dr. in Maple Heights, Cuyahoga Co.;

O.—**C. F. Replogle Co.,** Circleville, O., LB **$2,604,254,** est. $2,694,000 Contr. No. JAC 35-0708 6.5 mi. section US 35, to eliminate 5 narrow bridges and several steep hills and sharp curves, Proj. calls for 2 lane pavement on 4 lane right-of-way, begins 3 mi. northwest of Jackson and extends to about 3 mi. southeast of Ross Co. line, 2 full roadway width 44 ft. bridges will be constr. over Little Sale Creek to replace existing structures, the creek channel will be straightened to eliminate the need for three other existing bridges, Jackson Co.;

O.—**Harry Miller Excavating Co. & Central States Constr. Co.,** Suffield, O., LB **$2,439,093,** est. $2,552,500, Contr. No. MED 1-1091, constr. 3.5 mi. section of Cincinnati-Conneaut Freeway State Rte. 1 from intersection of State Route 3 and County Rd. 78 to just northeast of State Route 3 and County Rd. 78 to just northeast of State Route 57 Poe Rd. intersection the Freeway segment which runs parallel to US 42 3 mi. south of Medina 4 lane divided highway will be constructed on 300 ft. wide right-of-way and will have an 84 ft. median strip, both inside and outside shoulders will be paved, 4 bridges will be constructed to carry Good, Abbott and Poe Rds. and State Route 57 over the Freeway, Medina Co.;

O.—**Fisher Constr. Co.,** 4053 Clifton St., Cincinnati, O., LB **$1,402,962,** est. $1,494,200, Contr. No. WAR-42-1923, constr. 3 mi. Waynesville traffic relief route to take heavy US 42 through off clogged Main St. in Waynesville, 4 lane divided, limited access section of highway along east side of town, begins at Pekin Rd. US 42 intersection extending to just north of Water St. where relocated section rejoins existing 42, 7 intersecting roads and streets will provide adequate access to downtown Waynesville, a direct turnoff to Main St. will be also provided, pavement on either side of a grass median strip will be 24 ft. wide median width is a minimum of 40 ft. 4 ft. shoulders will be paved, Warren Co. CD 12/6.

▲ **Cunningham Bros.,** 359 E. Grand Ave., Beloit, Wis., CA **$4,968,942,** Millcreek Sewerage System, Contr. No. 8, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Dec. 10 CD 12/20, under LB.

▲ **Square & Marra Constr. Co.,** Bedford, O., CA **$4,152,353,** est. $3,000,000, Kingsbury Run Storm Sewer, CLEVELAND, O. City, Louis L. Dresler, dir. Dpt. P. Wks., City Hall, Cleveland 14, O. Awarded Dec. 18. CD 11/11, under LB.

▲ **George Cassidy Sans Co.,** 5125 W. Division, Chicago, Ill. CA **$1,308,395.** general contract, lodge and other bldgs., Illinois Beach State Park, Zion Lake Co., ILLINOIS. State Dive. Archt. & Eng., State Capitol, Springfield, Ill. Grand total $2,287,935. CD 5/24.
William Adams Eng., Inc., 3911 W. North Ave., Chicago, Ill. CA **$377,500.** plumbing work, Illinois Beach State Park Lodge (Illinois);
Mohawk Elec. Co., 5520 Montrose St., Chicago, Ill. CA **$155,926.** electrical work, Illinois Beach State Park Lodge (Illinois);
Hanley & Co., 1502 S. Michigan, Chicago, Ill. CA **$269,980.** heating work, Illinois Beach State Park Lodge (Illinois);
Economy Excavating Co., 1207 10th St., Waukegan, Ill. CA **$176,134.** water mains and sewers, Illinois Beach State Park (Illinois).

▲ **WISCONSIN**—State Hy. Comn., State Office Bldg., Madison. Bids opened 12/17,

Wis.—**Lee H. Parker,** 2015 N. Richmond St., Appleton, Wis. LB **$526,665** (9 bidders) c. conc. 10.8 mi. East County Line, North County Line and South County Line, S.T.H. 175 Interchange Roads, U. S. Hy. 41, Contrs. 2 and 1, Projs. F 03-1 (64) and F 03-1 (65), Dodge and Fond du Lac Counties; LB **$750,669** (16 bidders) c. conc. 12.794 mi. Richfield Interchange-Allenton Interchange Road, U. S. Hy. 41, Contr. 1, Proj. F 03-1 (262), Washington Co.;

Wis.—**John F. Bloomer Co.,** 341 W. College Ave., Appleton, Wis. LB **$729,076.** (6 bidders), grading 2.246 mi. S.T.H. 114-North County Line (S.T.H. 114 to S.T.H. 150) Road, U. S. Hy. 41, Contr. 1, Proj. F 03-2 (37), Winnebago Co.;

Wis.—**N. M. Isabella,** 714 Market Place, Madison, Wis. LB **$824,450** (16 bidders) c. conc. 12.692 mi. Allenton Interchange-West County Line and East County Line-North County Line Roads, U. S. Hy. 41, Contr. 1, Projs. F 03-1 (63) and F 031 (64), Washington and Dodge Counties;

Wis.—**R. W. Constr. Co. & Badger State Constr. Co.,** 3140 W. Fond du Lac Ave., Milwaukee, Wis. LB **$1,855,673.** (10 bidders), base, b. conc. pavement and structures B-30-8, 9, and 10, 4.223 mi. Illinois State Line-Milwaukee County Line (C.T.H. 'V-S.T.H. 43 Section) Road, Interstate Hy. 94, Contr. 1, Proj. I 101-1 (5), Kenosha Co.;

Wis.—**H. F. Radandt, Inc.,** 3110 Locust St., Eau Claire, Wis. LB **$310,232.** (6 bidders), grade, base and Structure B-71-13 6.427 mi. West County Line-S.T.H. 13 Road, Hy. 73, Contr. 1, Proj. S 043 (3), Wood Co.;

Wis.—**H. Turner & Son,** Boscobel, Wis. LB **$228,570.** (18 bidders), grade, subbase, base and Structures B-67-40 and B-67-41, 0.852 mi. S.T.H. 164-Goerkes Corner Road, Interstate Hy. 94, Contr. 1, Proj. I 102-1(7), Waukesha Co. CD 12/2.

▲ **S. A. Healy Co. & Gargaro Co., Inc.,** 40 East 7-Mile Rd., Detroit, Mich., CA **$3,627,777** (joint venture) Contract PW-2194, Section I, concrete sewers in tunnel in Livernois from Joy Rd. to Fullerton; Contract PW-2195, Section II, concrete sewers varying in size built in tunnel in Livernois from Fullerton to Puritan, DETROIT, MICH. City, Glenn C. Richards, comr. P. Wks., City-County Bldg., Detroit, Mich. Bids Dec. 10. CD 12/17, under LB.

BUILDINGS—LB & CA

▲ **Knowlton Constr. Co.,** 1133 Columbus Ave., Bellefontaine, O., LB **$2,523,000,** est. $2,933,639, general contract, Phase 2, MEDIUM SECURITY PRISON, near LEBANON, O. Ohio Dpt. P. Wks., State Dpt. Bldg., Columbus, O. Bids Dec. 19. CD 11/25;
H. J. Osterfield, 362 Huffman St., Dayton, O., LB **$369,000,** est. $619,925, plumbing, medium security prison (Lebanon, O.).

▲ **Corbetta Constr. Co. Inc.,** 208 S. La Salle St., Chicago, Ill., LB **$4,926,168.** HIGH SCHOOL, three 2 story brick academic buildings Sibley Ave. and Cottage Grove, DOLTON, ILL. Thornton Twp. School Dist., 205, 151 and Broadway, Harvey, Ill. Samuelson & Sandquist, 7161 N. Cicero Ave., Lincolnwood, Ill., archts.

▲ **Henry Bros. Co.,** 9112 S. Ashland Ave., Chicago, Ill., CA **$1,400,000.** ADMINISTRATION BLDG., KITCHEN and DINING HALL, DORMITORY BLDG., GYMNASIUM, GARAGE and FACULTY BLDG., 203 St. and Government Hy., OLYMPIA FIELDS, ILL. Augustinian Fathers, 250 E. 111 St., Chicago, Ill. CD 12/19, under LB.

▲ **Hutter Constr. Co.,** 134 Western Ave., Fond du Lac, Wis., CA **$1,663,552,** general contract HOSPITAL alterations, addns., PORT WASHINGTON, WIS. St. Alphonsus Hospital, 743 N. Montgomery St., Port Washington, Wis. Bids Dec. 4. CD 12/12, under LB.

▲ **Sorensen-Gross Constr. Co.,** 2505 Lapeer St., Flint, Mich., CA **$1,638,000,** AUDITORIUM, to incl. Offices, Veterans Service Department, Stores and Warehouse space, Meeting Rooms, FLINT, MICH. Industrial Mutual Assn., Hubert L. Curtis, pres., 551 James P. Cole Bldg., Flint, Mich. Bids Dec. 13, awarded Dec. 17. CD 11/8.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 7 Iowa

STREETS AND ROADS

January 7 Iowa

BUILDINGS—BA

▲ **Tex., Houston**—HOTEL—BA 1/9—The Rice Hotel, Main and Texas Sts. (selected list of bidders) 5 story hotel annex and swimming pool, $3,000,000. J. Russ Baty, 208 Bankers Mortgage Bldg., Houston, Tex., archt. Bob Cummins, c/o Bankers Mortgage Bldg., and Dale S. Cooper & Assocs., 3815 Garrott St. Houston, Tex., engrs. Extended date. CD 11/14.

▲ **Tex. San Antonio**—SCHOOL—BA 1/14—San Antonio Independent School Dist., Lavada and Matagorda Sts., Sam Houston High School, $1,250,000-$1,600,000. W. E. Simpson Co., 945 Milam Bldg., G. M. Baker, 342 W. Woodlawn St., engrs. Phelps & DeWees & Simmons, 342 W. Woodlawn St., board archts. Bartlett Cocke, 3501 Broadway, exec. archt. CD 12/19.

▲† **Tex., El Paso**—HOUSING—BA About 2/4—U. S. Eng., Box 1538, Albuquerque, N. M., 125 Capehart Housing units for Wm. Beaumont General Army Hospital, incl. utilities, ENG 29-005-58-22. $1,000,000-$5,000,000. Extended date. CD 10/16.

HEAVY CONSTRUCTION—LB & CA

▲ **IOWA**—State Hy Comn., Ames,

Iowa—**Booth & Olson, Inc.,** 529 Ins. Exch. Bldg., Sioux City, Iowa, CA **$3,192,219,** c. conc. 14.019 mi. Interstate Route 3 from near S.W. corner Sec. 27-76-44 northerly to U. S. 30 near N.W. corner Sec. 21-78-44, 1-920 (6), Harrison-Pottawattamie; CA

$971,841, c. conc. 4.466 mi. Interstate Route 3 from north corporate line of Council Bluffs northerly to N.W. corner Sec. 34-36-44, I-920 (5), Pottawattamie Co.; CA **$439,174**, c. conc. 1.942 mi. relocation of U. S. 75 in Council Bluffs from Broadway Avenue north on 16th Street to north corporation line, U-1087 (2), Pottawattamie Co. CD 11/27;

Iowa—**Hallett Constr. Co.**, Crosby, Minn. CA **$3,182,485**. c. conc. 13.571 mi. Interstate Route 2 from point approximately 0.10 mi. north of Clarke County line northerly to Iowa 92 east of Bevington, IN-I-IG-853 (9), Warren Co.; CA **$1,305,886**, b. conc. 7.023 mi. Interstate Route 2 from near center Sec. 6-72-25 northerly to point approx. 0.1 mi. north of Warren County line, I-853 (8), Clarke and Warren Counties;

Iowa—**Western Contr. Co.**, 400 Benson Bldg., Sioux City, Iowa. CA **2,582,710**. c. conc. 10.761 mi. Interstate Route 2 from Iowa 92 near E¼ corner NW¼ Sec. 30-76-25, northerly to point near ecnter Sec. 31-78-25, I-853 (10), Polk and Warren Counties;

Iowa—**Cameron, Joyce & Co.**, 19 South 7 St., Keokuk, Iowa. CA **$2,661,397**. c. conc. 8.381 mi. Interstate Route 2 from point near center Sec. 31-78-25 northerly to point near N¼ corner NE¼ NE¼ Sec. 20-79-25, I-IG-853 (11), Polk Co. Bids Dec. 10. Grand total $14,335,712. CD 12/16, under LB.

▲† **Sodemann Heat & Power Co.**, 1737 Mackland Ave., St. Louis 10, Mo., LB **$1,752,944**, Base Bid, (7 bidders) air-conditioning at U. S. Court House and Custom House, 1114 Market St., ST. LOUIS, MO. General Service Admin., P. Bldg. Services, 2306 E. Bannister Rd., Kansas City 14, Mo. Bids Dec. 18. CD 3/28.

▲ **NORTH DAKOTA**—State Hy. Dpt., Bismarck, Bids opened 12/20,

N. D.—**O. W. Swanson Constr. Co.** 550 Snelling Ave. S., St. Paul, Minn., LB **$1,822,445**, c. conc. 12.197 mi. Interstate Route No. 1 E. of Jamestown, Proj. No. 1-01-7(10), Stutsman and Barnes Counties;

N. D.—**Megarry Bros.**, St. Cloud, Minn., Alternates LB **$488,162**, base, b. conc. surfacing 12.197 mi. Contr. 1-01-7 (10). Stutsman and Barnes Counties;

N. D.—**Schultz & Lindsay Gravel Co.**, Fargo, N. D., LB **$242,238**, b. conc. base surf. 13.178 mi. SH 21 from near Carson easterly, Contr. F-30(6) & F-68 (4) Grant Co.; LB **$326,528**, b. conc. 19.849 mi. State Hy. 13 and 56 from near Lehr to near Kulm, Logan, Contr. S 254(14), S.-176 (5) and S-185 (4), McIntosh and La Moure Counties. CD 12/6.

▲ **KANSAS**—State Hy. Comm., Ottawa, Bids opened 12/19,

Koss Constr. Co., Pauline, Kan., LB **$973,661** (6 bidders), c. conc. 3.325 mi. beginning 200 ft. northeast of existing US-50 approx. 1½ mi. south of Ottawa; thence northeasterly on new location US-50 (Interstate). SP No. 50-30-I 02-3(15) Pt. I; LB **$1,098,444** (7 bidders), c. conc. 5.686 mi. beginning at north end Marais des Cygnes River Bridge approx. 1 mi. east of Ottawa, thence north and northeasterly on new location US-50 (Interstate). SP No. 50-30 I 02-3 (15) Pt. II; LB **$1,445,859** (6 bidders), c. conc. 7.376 mi. beginning approx. 1 mi. east Wellsville on Franklin-Miami Co. line, thence southwesterly on new location US-50 (Interstate) SP. No. 50-30 I 02-3(15) Pt. III, all foregoing in Franklin Co. CD 12/5.

▲ **Dondlinger & Sons Constr. Co.**, P.O. Box 2033, Wichita, Kan. LB **$2,829,273**, est. $3,075,000. (6 bidders), Contract No. 1, secondary sewage treatment facilities, WICHITA, KAN. City, Robert H. Hess, dir. Water Supply & Sewage Treatment, City Hall, Wichita, Kan. Bids Dec. 16. CD 11/25;

Utility Contractors, Inc., 610 North Main St., Wichita, Kan. LB **$839,480**, est. $9500,000: (9 bidders) Contract No. 2, sewage transmission main (Wichita, Kan.).

▲ **OKLAHOMA**—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,

Okla.—**Burbank Rock Co.**, P.O. Box 1772, Ponca City, Okla., CA **$450,281**, est. $535,202. grading, draining 7.314 mi. U.S. 77 south of Braman, Kay Co.;

Okla.—**Broce Constr. Co.**, Woodward, Okla., CA **$1,159,719**, est. $1,441,743, stab. aggreg. base and b. conc. surf. 7.328 mi. U.S. 77 south of Braman, Kay Co.;

Okla.—**Dahlgren Constr. Co.**, Commerce Exchange Bldg., Oklahoma City 2, Okla., CA **$666,360**, est. $826,779, sand asph. base and b. conc. surf. 3.521 mi. U.S. 66 east from Washita County line, Clinton, Custer Co.;

Okla.—**Haskins Constr. Co.**, Cordell, Okla., CA **$497,070**, est. $627,312, grading, drainage 3.731 mi. U.S. 66 east of Washita County line, Clinton, Custer Co.;

Okla.—**Austin Contg. Co.**, 1000 Singleton Blvd., Dallas, Tex., CA **$879,825**, est. $880,300. soil cement base and b. conc. surf. U.S. 66 through Elk City, Beckham Co.;

Okla.—**Peter Kiewit Sons Co.**, Southeast Station, Wichita, Kan., CA **$474,083**, soil cement base and c. conc. paving U.S. 66 east of Elk City, Beckham Co.;

Okla.—**Suddreth Constr. Co.**, Mid American Bank Bldg., Oklahoma City 2, Okla., CA **$164,693**, est. $194,127 grading, draining, 1 hy. underpass 1.72 mi. U.S. 66 east of Elk City, Beckham Co.;

Okla.—**Honnegar Bros. Co.**, 2912 W. 39 St., Oklahoma City, Okla., CA **$1,138,150**, est. $1,163,721 stab. aggreg. base and b. conc. surf. 4.053 mi. Hy. 74 west of Norman, Cleveland Co.;

Okla.—**Amis Constr. Co.**, 1647 Exchange Ave., Oklahoma City 8, Okla., CA **$848,596**, est. $942,109 stab. aggrgt. base, b. conc. surf. 2.713 mi. U.S. 77 b pass south of 20 St. in Oklahoma City, Oklahoma Co.;

Okla.—**Standard Industries, Inc.**, 2119 E. 11 St., Tulsa, Okla., CA **$1,182,547**, est. $1,289,664, stab. aggreg. base and b. conc. surf. 3.53 mi. on U.S. 77 by pass south of Oklahoma City, Oklahoma Co.;

Okla.—**H. D. Youngman**, Baxter Springs, Kan., CA **$1,378,721**, est. $1,594,499, stab. aggreg. base and b. conc. surf. 3.71 mi. on U.S. 77 bypass north from Cleveland Co. line, Oklahoma Co.;

Okla.—**Frix & Foster**, 1200 S. Cherokee St., Muskogee, Okla., CA **$597,218**, est. 688,622, grading, draining 4.996 mi. U.S. 77 south of Oklahoma Co. Line, Logan Co.;

Okla.—**Lyles & Buckner**, Commercial Natl. Bank, Muskogee, Okla., CA **$1,199,870**, est. $1,233,849, c. conc. 5.219 mi. US. 77 north from Bradbury interchange, Logan Co.;

Okla.—**Gaines Bros. Co.**, Box 1006, Miami, Okla., CA **$110,493**, est. $102,968, grading, draining 6.899 mi. Hy. 10 east from Nowata Co. line, Craig Co.;

Okla.—**Ertz Constr. Co.**, 2201 Classen St., Oklahoma City 6, Okla., CA **$439,094**, est. $439,266 soil cement base and b. conc. surf. 5.311 mi. U.S. 66 through Canute, Washita Co. Grand total $11,186,724. Bids Dec. 17, awarded Dec. 18.

▲ **Moorman, Dewitt & Singleton**, Box 8397, Fort Worth and **Whittle Contg. Co.**, Box 5602, Dallas, Tex. CA **$4,301,200**. constr. Iron Bridge Dam and reservoir, TEXAS. Sabine River Auth. of Texas, P.O. Box 195, Greenville, Tex. Bids Dec. 13, awarded Dec. 18. CD 11/25.

▲ **R. B. Hodgson & Co.**, 4614 Dyer St., Dallas, Tex. CA **$2,260,902**; constr. Paul Davis Field Water supply line Contr. A-70,905 lin. ft. x 30 in. concrete cylinder pipe; Contr. B-87,215 lin. ft. 30 in. concrete cylinder pipe, 6,000 lin. ft. 12 in. c.i. well collection lines, MIDLAND, TEX. City, c/o J. M. Orman, mgr., Midland, Tex. Bids Dec. 18. CD 11/29.

BUILDINGS—LB & CA

▲ **J. E. Dunn Constr. Co.**, 929 Holmes, Kansas City, Mo., CA **$1,523,066**, Chouteau Court HOUSING, 20 buildings, 2 and 3 story, KANSAS CITY, MO. Kansas City Housing Authority, Joseph Brady, dir., 1220 Independence Ave., Kansas City, Mo. Bids Dec. 10. CD 12/13, under LB.

▲ **Dickmann, Pickens & Bond**, Gazette Bldg., Little Rock, Ark. LB **$1,585,180** Base Bid 4 story, bsmnt., WOMENS DORMITORY WING and 1 story LOUNGE and DINING ROOM to be connected, FAYETTEVILLE, ARK. University of Arkansas, T. C. Carlson, secy.-treas., Fayetteville, Ark. Bids Dec. 18. CD 12/9.

▲† **V. O. Stringfellow**, 3602 S. Yorktown St., Tulsa, Okla., CA **$6,499,700**, 450 family HOUSING units at Clinton Air Base, Inv. No. 34-611-58-2, CLINTON, OKLA. Eighth Naval Dist. at Bldg. S-420, Foss, Okla. Bids Oct. 15. CD 10/31, under LB.

▲ **Fisher Constr. Co.**, Box 6325, Houston, Tex., CA **$1,224,000**. Phase 3, St. Lukes' Methodist CHURCH, HOUSTON, TEX. St. Lukes' Methodist Church, 3471 Westheimer St., Houston, Tex. CD 5/6.

▲ **J. W. Cooper Constr. Co.**, P.O. Box 3947, Odessa, Tex. CA **$1,455,832**, general contract Permdan HIGH SCHOOL, ODESSA, TEX. Odessa Independent School Dist., Odessa, Tex. Bids Dec. 12, awarded Dec. 17. CD 12/16, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
January 22 California

BUILDINGS—SLC

▲ **Calif., Salinas**—INN—BA 1/3—Rickey's Salinas Inn., c/o Ernest Kump, archt., 450 Ramona St., Palo Alto, soon lets contract, wood frame, concrete slab floor inn. **$2,500,000**. CD 3/14 under Rickey & Pick as owners.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, Bids opened 12/18,

Frederickson & Watson Constr. Co., Ransom Co., 873 81st Ave., Oakland, Calif. LB **$7,620,605** (11 bidders) 8.8 mi. 4 lane freeway on U. S. Hy. 40 near East end of Donner Lake to slightly West of Boca, incl. constr. 11 structures, Nevada Co. CD 11/13.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

Griffith Co., 1060 S. Broadway, Los Angeles, Calif., CA **$3,317,563**, grading surf. 1.2 mi. 6 and 8-lane divided freeway between 1.2 mi. east of Taylor St. and 0.5 mi. east of U. S. 395 in San Diego and constr. 6 structures reconstr. separation and widn. San Diego River Bridge, San Diego Co. Bids Nov. 7. CD 11/11, under LB.

BUILDINGS—LB & CA

▲ **Stolte, Inc.**, 8451 San Leandro St., Oakland 21, Calif., CA **$1,792,000**. VITICULTURE and POMOLOGY BLDG., University California, DAVIS, CALIF. Office Architects & Engineers, University of California, Arboretuxm and Hutchison Dr., Davis, Calif. Bids Nov. 26, awarded Dec. 16. CD 12/5, under LB.

▲ **R. J. Daum Constr. Co.**, 12537 S. Cerise Ave., Hawthorne, Calif. CA **$2,346,000**, Milikan JUNIOR HIGH SCHOOL, North Hollywood, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Dec. 4. CD 12/10, under LB.

▲ **C. L. Peck**, 816 W. 5th St., Los Angeles, Calif. LB **$6,500,000**. OFFICE BLDG., 15 story, 200,000 sq. ft., 273 ft. high granite and stone facing, steel framing, Q-Cell sys. 3 basement floors for parking, LOS ANGELES, CALIF. Spring St. Realty Co., 621 S. Spring St., Los Angeles, Calif. Bids Dec. 19. CD 11/29.

▲ **Acme Constr. Co.**, 827 13 St., Modesto, Calif., LB **$2,549,900** Base Bid (6 bidders) (1) Atwater Winton HIGH SCHOOL on Winton Way and Fruitland and (2) MERCED HIGH SCHOOL on G St. and Main St., MERCED and ATWATER, CALIF. Merced Union High School Dist., 1835 N St., Merced, Calif. Bids Dec. 18. CD 12/2.

▲ **Carl N. Swenson**, 1095 Stockton St., San Jose, Calif. LB (1) **$2,656,000** (2) **$2,650,900** (3) $2,620,000 (4) $2,505,000 (5) $2,450,000 (6) $2,378,000 (9 bidders) 153,000 sq. ft. U. S. Naval INDUSTRIAL SUPPORT FACILITIES, SUNNYVALE, CALIF. Lockheed Aircraft Corp., Missile Sys., Div. P. O. Box 504, Sunnyvale, Calif. Bids Dec. 18. CD 12/5.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
January 22, February 5 Ontario

HEAVY CONSTRUCTION—LB & CA

▲ **Michaud & Simard, Inc.**, 575 Arago St. W., Quebec City, Que., CA **$1,891,845**, constr. two, 200 x 6,000 ft. runways with ancillary taxiways and aircraft parking area, entrance road and road diversion at new Sault Ste, Marie Airport at Point aux Cheneu near SAULT STE. MARIE, ONT. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Oct. 31, awarded Dec. 13, CD 11/14, under LB.

▲ **Pigott Constr. Co. Ltd.**, 1250 Bay St., Toronto, Ont., CA **$4,459,000**, (6 bidders) sewerage treatment plant, north of Queen St., extension on west bank of Humber River, constr. of proposed main bldg., digestion tanks and related structures, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Nov. 25, awarded Dec. 16. CD 12/9, under LB.

▲ **Carter Constr. Co. Ltd.**, 419 Cherry St., Toronto, Ont., LB **$1,885,000** (9 bidders) grain elevator addn., imprvs. to handle increased capacities made necessary by the St. Lawrence Seaway Proj., Quebec Harbor, QUEBEC CITY, QUE. National Harbors Bd., West Block Parliament Bldgs., Ottawa, Que. Owners Staff, and C. D. Howe Co. Ltd., 1421 Atwater Ave., Montreal, Que., engrs. Bids Dec. 19. CD 11/27.

BUILDINGS—LB & CA

▲ **Thomas Fuller Constr. Co., Ltd.**, 199 Richmond Rd., Ottawa, Ont., CA **$1,609,000** (25 bidders) 3 story basmnt., 98 x 200 ft. rein.-con. WAREHOUSE and 4 story RETAIL AND OFFICE AREA, 60 x 80 ft. truck loading area, off Metcalfe Hy., OTTAWA, ONT. Liquor Control Board of Ontario, 55 Fleet St. E., Toronto, Ont. Belharrie, Helmer & Morin, 77 Metcalfe St., Ottawa Ont., archts. Awarded Dec. 13, CD 1/15.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲† **HONDURAS**—Bureau P. Rds., Dpt. Commerce, Inter-American Highway Div., 18 and F Sts. N.W., Wash., D. C., U.S.A.

Thompson, Cornwall, Inc., 401 Chrysler Bldg., New York 17, N. Y., U.S.A., LB **$2,495,380**. grading, draining, special sub-base, bridge and other works, between El Savador Border and Nicaragua Border, Honduras Project 56-1 (a). Bids Dec. 19. CD 12/2.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲ **Raymond Concrete Pile Co.**, 140 Cedar St., New York, N. Y., U.S.A., and **Williams Bros.**, 324 Natl. Bank Tulsa Bldg., Tulsa 3, Okla., U.S.A., **Richard Costain, Ltd.**, London, England, **John Brown Ltd.**, London, England, **Werkspoor & Bredero**, Netherlands, CA Total **$56,000,000**, est. $140,000,000, expanding Gach Saran Oil Field, incl. tanker terminal at Karg Island, 26-28-in. pipe line from oilfield to sea, 3 in. underwater (150 ft. deep) pipe line, storage shops, housing, jetty and boat harbor., IRAN. Iran Oil Exploration Co., Tehrah, Iran.

▲† **Dragados Y Construcciones-Moyer Brothers**, Madrid, Spain, LB **$3,352,342**, Naval Fuel Annex, CAR-4, Spanish Air Base Program, CARTEGENA, SPAIN. Bureau Yards & Docks, Dpt. Navy, 18 and Constitution Ave. N.W., Wash., D. C., U.S.A. Bids Nov. 27. CD 11/12.

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

▲ **Idaho, Idaho Falls**—City, City Hall, voted **$1,600,000** bonds Dec. 10, disposal plant and sewerage sys. expansion. **$450,000**. CD 11/12.

▲ **Ill., East St. Louis**—Centreville Twp., Francis Touchette, ch. superv., Church Lane, Centreville Twp., East St. Louis, sanitary sewerage system in area, Centreville Township. **$6,640,089**. Hurst-Rosche, Engineers, Hillsboro, consult. engrs.

▲ **Mich., Madison Heights**—City, Myrtle Chamberlain, clk., 26303 John R. St., voted bonds Dec. 9, storm and sanitary sewers. $1,500,000. CD 12/4.

▲ **Mich., Pontiac**—Oakland Co., Harold K. Schone, Dpt. P. Wks., Pontiac, Evergreen Sanitary Interceptor Sewer. $3,000,000. Hubbell, Roth & Clark, 954 N. Hunter Blvd., Birmingham, engrs. Bids in April. CD 10/29/54.

▲ **N. Y., West Seneca**—Town, Town Hall, 4620 Seneca St., sewer lines in Sewer District No. 13, $2,404,700. Krehbiel & Krehbiel, 2000 Sheridan Dr., Tonawanda, consult. engrs. CD 11/19/52.

▲ **Tex., Waco**—City, City Hall, drainage sys. $3,141,000; sanitary sewers, $350,000.

▲ **Vt., Montpelier**—City, R. Irving, mgr., sewage treatment plant. $1,775,000. Whitman & Howard, Inc., 89 Broad, Boston, Mass., civil engr. CD 10/30.

▲ **Wis., Milwaukee**—City, City Hall, sewer program for 1958. $5,250,000. E. A. Schmidt, city engr.

STREETS AND ROADS

▲ **NEW HAMPSHIRE**—Dpt. P. Wks. & Hys., Concord,
Belknap Co.—b. conc. roadway and bridge 1.8 mi. N. H. 106, Belmont. $365,000.
Carroll Co.—b. conc. roadway and 2 bridges 5 mi. N. H. 16, Wakefield. $875,000.
b. conc. roadway and bridge 1.6 mi. over railroad, Ossipee. $310,000.
Cheshire Co.—b. conc. roadway 3.8 mi. on N. H. 9, Keene. $1,000,000.
3 mi. surface treated crushed gravel roadway and a bridge, N. H. 12, Fitzwilliam. $540,000.
Grafton Co.—surface treated crushed gravel roadway and a bridge 2 mi. N. H. 25, Wentworth. $500,000.
surface treated gravel roadway 1.25 mi. Kancamaugus Hy., Lincoln-Livermore. $150,000.
b. conc. roadway, 2 bridges and 2 interchanges 1.36 mi., Franconia. $1,000,000.
2 mi. hot b. conc. road and bridge Franconia. $1,000,000.
b. conc. roadway, 3 bridges and 2 interchanges 1.5 mi. Franconia. $1,250,000.
b. conc. roadway and a bridge 2.5 mi., Franconia, Lisbon, Bethlehem. $1,250,000.
Hillsboro Co.—surf. treated gravel roadway and a bridge 3.1 mi. N. H. 101, Peterboro. $750,000.
Nashua Co.—b. conc. roadway and a bridge 2.5 mi. Nashua By-pass. $600,000.
Merrimack Co.—surf. treatment gravel roadway, relocation of Jewett Rd., 0.6 mi., Hopkinton. $250,000.
4 lane divided roadway with 5½ in. b. conc. and 2 bridges 3 mi. Interstate Rte. 2, Concord. $1,250,000. M. L. Chase, c/o owner, design engr.

▲ **Tex., Waco**—City, City Hall, street imprvs. and paving, $7,104,000.

EARTHWORK, WATERWAYS

▲ **Conn., Bristol** — Farmington Valley Flood Control Comn., City Hall, flood control facilities, storage reservoirs, deepening, widening, and straightening water courses of Pequabuck River. $2,545,000. John J. Mozzochi & Assocs., 265 Hebron Ave., Glastonbury, engrs. (**Correction**—Goodkind & O'Dea, 1214 Dixwell Ave., Hamden, are not consult. engrs. on this project). CD 11/29.

AIRPORTS

▲† **Me., Presque Isle**—GUIDED MISSILE BASE—U. S. Eng., 150 Causeway St., Boston, Mass., guided missile base (Snark Intercontinental Range), Air Force Base, $12,000,000. Constr. 1958. CD 8/21/56.

▲ **Mass., East Boston**—HANGAR, etc.—Northeast Airlines, Logan Airport, hangar, offices, maintenance shops, $2,500,000.

▲† **N. M., Alamogordo**—MISSILE FACILITIES—U. S. Eng., P.O. Box 1538, Albuquerque, missile facilities, incl. laboratories, rocket launching pads, buildings, at Holloman Air Force Base. $12,500,000.

▲† **N. M., Albuquerque**—MISSILE FACILITIES—U. S. Eng., Box 1538, missile facilities at Kirkland Air Force Base. $2,000,000.

▲† **N. M., Albuquerque**—MISSILE FACILITIES—U. S. Eng., Box 1538, Albuquerque, missile facilities at Sandia Base. $1,000,000.

▲† **N. M., Roswell**—MISSILE FACILITIES—U. S. Eng., P. O. Box 1538, Albuquerque, missile facilities, incl. laboratories, rocket launching pads and bldgs. at Walker Air Force Base. $13,500,000.

LATIN AMERICA

▲ **Ecuador, Manabi**—PORT DEVELOPMENT—Ministro De Obras Publicas y Communicaciones, Quinto, Ecuador, port development, incl. stone breakwater, jetty system, 4,000,000 cu. meters dredging, concrete pier on piling, fender piling, 3 warehouses, crane, navigation aids, etc. from Pacific to Rio Chone Bahia De Caraguez, Manabi, $4,500,000. Rader & Assocs., 111 N.E. 2 Ave., Miami, Fla., U.S.A., consult. engrs.

FOREIGN

▲ **Jordan**—REFINERY—Jordan Petroleum Refinery Co. Ltd., Amman, Jordan, plans oil refinery, near Zarka, $10,000,000.

PUBLIC BUILDINGS

▲ **Calif., Los Angeles**—BOYS CAMP—Los Angeles Co., Hall of Records, Junior and Senior Boys Camp at Lake Hughes. $1,692,674.

▲ **Calif., San Francisco**—ART AND CLASSROOM—City College of San Francisco, c/o Supt. Schools City and County of San Francisco, 135 Van Ness Blvd., 3 story art and classroom bldg. at City College, physical educ. bldg., athletic field, addnl. wings to men's and women's gyms. $2,000,000. Constr. approx. Aug. 1958. CD 11/9/56.

▲ **Calif., Woodland**—SCHOOL ADDNS.—Woodland Union High School Dist., c/o Supt., Woodland, plans by Sparks, Jozens & Nacht, Native Sons Bldg., Sacramento, High School addns. $1,197,000.

▲ **Conn., Enfield**—SCHOOL—Town, Town Hall, plans by Olson & Miller, 742 Asylum Ave., Hartford, high school. $3,000,000. CD 6/18.

▲† **Ill., Lemont**—ACCELERATOR—Atomic Energy Comn., Lemont, proton accelerator to produce 12.5 billion volts of electricity at Argonne Laboratory. $27,000,000.

▲ **Kan., Manhattan**—DORMITORY—State, Bd. Regents, State House, Topeka, Kan., plans by Eckdahl, Davis & Depew, New England Bldg., Topeka, men's dormitory for State College. $2,422,000. Constr. 1958. CD 1/16/56.

▲ **Mass., Amherst**—ENGINEERING SHOPS, etc.—Commonwealth Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, plans by John Guarino, 2 Lexington St., East Boston, Mass., engineering shops, $350,000; plans by Desmond & Lord, 6 Beacon St., Mass., U58-2, school of education, $1,743,000; U57-1, science group (third section), $1,415,000, at University of Mass.

▲ **Mass., Orleans**—SCHOOL—Orleans-Eastham & Wellfleet School, Dist. School Dpt., plans by Walter M. Gaffney Assoc., West Main St., Hyannis, Regional Junior-Senior High School. $1,000,000. CD 9/28/54.

▲ **Mass., Tewksbury**—SCHOOL—Town, School Dpt. plans by S. W. Haynes & Assoc., Inc., 336 Main St., Fitchburg, high school $1,400,000. CD 9/26/56.

▲ **Minn., Mound**—SCHOOL—Bd. Educ., Independent School Dist. No. 277, A. F. Gallestad, clk., $1,550,000 bond election Jan. 28, Junior High School, acquiring site and furnishing equip. $1,300,000. Thorshov & Cerny, Inc., 400 Metropolitan Bldg., Minneapolis, archts. CD 11/22/55.

▲ **Mont., Billings**—SCHOOL—School Dist. No. 2, Clerk of School Bd., 2911 4th Ave. N., voted $1,900,000 bonds Dec. 9, high school, elementary school and school addn. $1,550,000. Drake & Gustafson, Empire Bldg., and Nordquist & Sundell, 1233 N. 27th St., archts. CD 11/21.

▲ **Neb., Omaha**—HIGH SCHOOLS—Bd. Educ., 3902 Davenport St., North High School addn. $1,500,000; Benson High School addn. $1,000 000. CD 11/28/55.

▲ **N. D., Fargo**—AUDITORIUM—City, City Hall, plans by Thorshov & Cerney, Inc., 400 Metropolitan Bldg., Minneapolis, Minn., and Siefert & Stasza Associates, assoc. archts., Fargo, auditorium. $1,725,000. R. Rapson, 720 Washington Ave S.E., Minneapolis, Minn., design. archt. CD 6/22/56.

▲ **N. D., Fargo**—SCHOOLS—Bd. Educ., 1104 2nd Ave., plans by H. E. Bechtel, 3711-2nd Ave., three elementary schools. $1,800,000.

▲ **Ore., Corvallis**—DORMITORIES—Bd. Higher Educ., University of Oregon, Eugene, plans by Burns, Bear McNeil & Schneider, 2940 S.E. Belmont St., Portland, dormitory to house 366 women, with cafeteria and a roof-top play area. $1,800,000, A bond issue will pay $1,600,000 of the project. CD 2/12.

▲ **Pa., Pittsburgh**—COUNTY OFFICE—Allegheny Co., Dpt. Properties & Supplies, Pittsburgh plans by Charles & Edward Stotz, archts.-consult. engrs., Bessemer Bldg., 8 or 9 story county office bldg. addn. Diamond and Ross Sts. $8,700,000. CD 12/3.

▲ **Pa., Unity**—SCHOOL—Plum Borough School Bd., Unity, secondary school for Plum Borough. $2,011,300. CD 12/15/55.

▲ **S. D., Mitchell**—SCHOOL—Bd. Educ., plans by W. J. Dixon, Mitchell, high school, 9th and N. Capitol Sts. $1,200,000. CD 8/20/56.

▲ **Tenn., Memphis**—OFFICE, etc.—Shelby Co., Criminal Court Clerk, Memphis, plans by A. Z. Aydelott & Assocs., 2080 Peabody Ave., Memphis, and J. Frazer Smith & Assocs., archts. and engrs., 1503 Union Ave., Memphis, Tenn., county office bldg. and modernization of courthouse and criminal courts bldg. $1,250,000.

▲ **Tex., Denton**—SCHOOL FOR RETARDED CHILDREN—Bd. for Texas Hospitals & Special Schools, 4405 Lamar Blvd., Austin, plans by Harper & Kemp, c/o Thomas Bldg., Dallas, State School for Retarded Children. $2,269,490.

▲ **Tex., Raymondville**—HOUSING—Willacy County Housing Auth., c/o Courthouse, plans by Matkin & Fitch, archts.-consult. engrs., 4101 San Jacinto, Houston, 100 units low cost housing, Port Mansfield. $1,000,000. CD 4/19.

▲ **Tex., San Antonio**—SCHOOL—San Antonio Ind. School Dist., Lavaca and Matagorda Sts., plans by Bartlett Cock, 3501 Broadway and Phelps & Dewees & Simmons, 342 W. Woodlawn St., high school, St. Hedwig Rd., near Coliseum. $1,600,000. W. E. Simpson Co., 945 Milam Bldg., and Gerard M. Baker, 342 W. Woodlawn St., consult. engrs. CD 11/11

▲ **Wash., Longview**—SCHOOL—School Dist. 122, voted $2,600,000 bonds Dec. 10, constr. a new elementary school and addn., modernization of several existing schools, extension of Lower Columbia Junior College and installation of a swimming pool for joint use of Longview High School and the Junior College, $430,000. R. Newhall, Longview, archt. CD 11/19.

▲ **Wis., Milwaukee**—STATE OFFICE—State Bldg. Comn., State Capitol, Madison, plans by Roger C. Kirchoff, state archt., state office bldg., Civic Center, W. Wells St., W. Kilbourne Ave., N. 6 and N. 7 Sts. $3,241,000. CD 8/30/56.

▲ **Ont., Waterloo**—SCHOOL—Kitchener-Waterloo High School Bd., c/o J. P. Van de Water, 787 King St. W., Kitchener, 17 classroom school with art room, music room, double gymnasium, home economics room, cafeteria, auditorium, etc. $1,180,000.

▲ **Que., Riviere des Prairies (Montreal Suburb)**—CLINIC-REFORM SCHOOL—Provincial Dpt. of Youth & Social Welfare, Parliament Bldgs., Quebec, City, plans by Ludger Venne, 515 Demontigny St. E., Montreal, Clinic-Reform School. $1,000,000.

COMMERCIAL BUILDINGS

▲ **Ark., Pine Bluff** — HOUSING — Clyde H. Smithwick Realty Co., 3815 W. 28th St., housing development, incl. streets, sewers and drainage facilities, east of here. $8,000,000.

▲ **Calif., Palo Alto**—MARRIED STUDENTS APARTMENTS—Bd. Trustees Stanford University, Palo Alto, plans by Wurster, Bernardi & Emmons, 202 Green St., San Francisco, married student apartments. $3,000,000. CD 4/8/53.

▲ **Calif., San Francisco** — HEADQUARTERS — American President Lines, c/o Anshen & Allen, archts. 461 Bush St., 21 story, penthouse rooftop headquarters bldg., Kearny and California Sts. $8,000,000.

▲ **Calif., West Los Angeles**—OFFICE—Arthur Kaplan & Stanley Bzack, c/o Sam Reisbord & Fred Posner, archts., 4964 Hollywood Blvd., Los Angeles, 5 story, 55,000 sq. ft., rein. brick office bldg., 8831-33 Sunset Blvd. $1,500,000.

▲ **Conn., Hartford**—ENGINEERING, etc.—University of Hartford, 315 Hudson St., plans by Moore & Salisbury, 1007 Farmington Ave., West Hartford, engineering, science and mathematics bldg., Bloomfield Ave., $1,000,000, Marchant & Minges, 1007 Farmington Ave., West Hartford, consult. engrs. CD 8/21/56, under Hillyer College, as owner; plans by Moore & Salisbury, 1007 Farmington Ave., West Hartford, business administration bldg. and library, over $400,000; fine arts and administration bldg., over $350,000; auditorium and service bldg., over $350,000; music bldg., over $345,000 student union bldg., over $350,000; liberal arts and education bldg., over $500,000. Marchant & Minges, 1007 Farmington Ave., West Hartford, consult. engrs.

▲ **Conn., Hartford** — APARTMENT — Watkinson School, 180 Bloomfield Ave., plans by Huntington & Darbee, 36 Lewis St., 6 story, 190 unit apartment bldgs. $3,700,000.

▲ **Ill., Chicago**—HOTEL—Devon Golf Links, Inc., 110 S. Dearborn St., plans by W. B. Cohan, 624 S. Michigan Ave., hotel 200 rooms, restaurant and swimming pool, bowling alley, retail store bldg., Lincoln, Devon and McCormick Rds. $2,000,000.

▲ **Ill., Elmwood Park**—HOSPITAL—West Towns Hospital Assocs., 3250 W. Lake St., Chicago, plans by A. Epstein & Sons, Inc., 2011 W. Pershing Rd., Chicago, 6 story, 125,000 sq. ft. hospital, north side of North Ave., west of 5th Ave. $4,000,000.

▲ **La., Alexandria**—HEADQUARTERS—Louisiana Baptist Convention, R. E. Lee, secy., 534 Jackson St., Shreveport, plans by Carl L. Olschner & Assocs., 421 Pere Marquette Bldg., New Orleans, Baptists Headquarters Building. $1,100,000. CD 7/2.

▲ **Mass., Boston** — OFFICE — Liberty Mutual Insurance Co., 175 Berkeley St., plans by Perry, Shaw, Hepburn & Dean, 31 St. James Ave., 10 story, metal walls, office bldg. back of present bldg. and facing St. James Ave. $7,000,000.

▲ **Mass., Gloucester**—HOTEL, etc.—Gloucester Gateway, Inc., Frank W. Abbott, Wenham, plans by Jerome Bailey Foster, 750 Main St., Winchester, hotel and marina consisting 126 apartments, Rust Isind, off Rte. 128, resort area. $1,000,000.

▲ **N. Y., New York**—APARTMENT—A. F. & G. Realty Corp., 391 E. 149 St., plans by Leff & Birnbaum, 12 E 48 St., New York, Zone 17, 12 story apartment on north side of Palisades Ave. near Independence Ave. $1,100,000.

▲ **N. Y., New York**—OFFICE—Argeal Corp., 15 Broad St., will not construct 13 story office, 113-33 Maiden Lane. $4,450,000. Project abandoned. CD 5/29/56.

▲ **N. Y., New York**—BANK, etc.—First National City Bank, 55 Wall St., Zone 5, will not construct bank and office alterations Madison Ave. and 42 St., $1,250,000. Project abandoned. CD 3/11.

▲ **N. Y., New York**—APARTMENT—157 E. 57 St. Corp., c/o Joseph P. Blintz, 545 Madison Ave., Zone 22, plans by S. J. Kessler & Sons, 551 Fifth Ave., Zone 17, 18 story apartment, northwest corner of 3 Ave. and 57 St. $1,500,000.

▲ **N. Y., Troy**—SCIENCE CENTER—Rensselaer Polytechnic Institute, Troy, science center to incl. underground vaults for atomic research. $6,000,000.

▲ **O., Columbus**—APARTMENTS—Todd Tibbals, 965 E. Broad St., Eastgate Apartments, Sunbury Rd. $1,620,000.

▲ **Tex., Alamo Heights**—APARTMENT—Don Danvers, c/o Bartlett Cocke, 3501 Broadway, San Antonio, luxury apartment. $4,000,000. CD 1/24, under Tex., San Antonio.

▲ **Tex., Arlington**—HOTEL, etc.—North Texas Development Corp., c/o F. L. Eddins, pres., Arlington, plans by Prinz & Brooks, 133 N. Industrial Blvd., Dallas, hotel, $1,400,000; shop arcade, $350,000; office, $1,250,000. CD 11/15.

▲ **Tex., Midland**—SHOPPING CENTER—Jack Reynolds, Pecos, Tex., shopping center. $1,000,000.

▲ **Tex., San Antonio**—SHOPPING CENTER—Jas. W. Rouse & Co., Inc., 14 W. Saratoga, Baltimore, Md., plans by Bartlett Cocke, 3501 Broadway, 380,000 sq. ft. floor space on 54-acre site regional shopping center, Proj. "North Star", off N. Military Hy. $3,500,000.

▲ **Wash., Seattle**—SHOPPING CENTER—Southcenter Corp., c/o J. B. Douglas, Northgate Co., 310 E. 110 St., shopping center in area south of city at 57 Ave. S. and Renton, Three Tree Point Rd. $20,000,000. Graham & Co., 1426 5 Ave., archts. CD 12/12.

▲ **Alta., Calgary**—OFFICE—The Alberta Wheat Pool, c/o 516 10th Ave. SW., plans by Clayton, Bond & Mogridge, 516 10th Ave. S.W., 8 story, rein.-con. with marble exterior finish on main floor level and ceramic terra cotta exterior finish on upper floors, 104,000 sq. ft. floor space, office bldg., 5th Ave. and 2nd St. W. $2,000,000. CD 10/4.

▲ **Ont., Toronto**—APARTMENT—Economy Constr. Co. Ltd., 786 Bay St., will not construct 200 suite apartment, Keele St. and Sheppard Ave. W. $2,000,000. Project abandoned. CD 10/14.

▲ **Que., Quebec City**—APARTMENTS—Henri C. Beaupre, 100 Place d'Youville, Apartment Block, 138 apartments, terraces and stone walls and a new type air conditioning system, Laurier Ave. $2,000,000.

INDUSTRIAL BUILDINGS

▲ **Colo., Denver**—ELECTRICAL DISTRIBUTION CENTER—Public Service Co. of Colorado, 15th and Champa Sts., Denver, electrical distr. center, West 8th Ave. and Platte River. $1,200,000. Fred Janssen, Standards & Fields Engr., 15th and Champa St., engr.

▲ **Idaho, Burley**—PLANT—Boise Cascade Corp., 114 S. 10 St., Boise, corrugated container plant. $1,000,000. Work to begin soon.

▲ **Ind., Gary**—LABORATORIES AND OFFICE—U. S. Steel Corp., 525 Wm. Penn Pl., Pittsburgh, Pa., plans by Beine, Hall & Curran, 607 Broadway, 1 and 2 story metallurgical laboratories and office bldg. $1,000,000. CD 3/19/56.

▲ **Ky., Calvert City**—PLANT—National Carbide Co., Div. Air Reduction Co., Inc., 150 East 42nd St., New York, N. Y., lime recovery plant. $2,000,000. Constr. 1958.

▲ **O., Willard**—FACTORY—R. R. Donnelley & Sons Co., 350 E. Cermak St., Chicago, Ill., 87,000 sq. ft., factory addn., to printing plant. $1,000,000.

▲ **Pa., North Wales**—RESEARCH AND DEVELOPMENT—Leeds & Northrup Co., 4901 Stenton Ave., Phila., Zone 44, plans by T. Norman Mansell, 1831 Chestnut St., Phila. Zone 3, research and development bldg. Walker-Yeomans Assocs., 1831 Chestnut St., Phila. Zone 3, consult. engrs. CD 1/7.

▲ **Pa., Pittsburgh**—CENTRAL LABORATORY—Bituminous Coal Research, Inc., 980 Kinner St., Columbus, O., central laboratory bldg. $1,000,000.

▲ **Tex., Houston**—AROMATICS PLANT RECOVERY UNIT—Sinclair Refining Co., c/o Ted. Banta, vice pres. in chg. Purch., 600 5th Ave., New York, N. Y., 100,000 sq. ft. aromatics plant recovery unit (to produce paraxylene used in mfg. of Dacron) to be at existing refinery site on La Porte Rd. $6,000,000. CD 5/9/47.

▲ **B. C., Vancouver**—WAREHOUSE, etc.—The T. Eaton Co. Canada Ltd., 515 West Hastings St., plans by Swan, Wooster & Partners, 1334 W. Pender St., 300,000 sq. ft. rein.-con. warehouse and service bldg., Broadway and Renfren St. $1,000,000.

▲ **B. C., Vernon**—BREWERY—Meister Brewery Ltd., c/o Allen & Huggins, archts., Vernon, brewery, comprising brew house, bottling and packing plant, offices and storage area. $1,500,000.

▲ **Ont., Hamilton**—PLANT EXPANSION—Stanley Works of Canada, Imperial St., plant to make electric tools. $1,000,000.

UNCLASSIFIED

▲ **Ala., Birmingham** — BOYLES YARDS — Louisville & Nashville R.R. Co., H. C. Forman, ch. engr., 908 W. Broadway, P.O. Box 1198, Louisville, Ky., enlarging Boyles Freight Yards. $9,000,000. CD 9/2/54.

▲† **Kentucky**—PARK FACILITIES, etc.—Commonwealth of Ky., Div. Purchases, Frankfort, plans by Meriwether-Marye & Assoc., archts.-consult. engrs., 248 E. Short St., Lexington, expansion of facilities at Ky. Dam Village State Park, McCracken Co., incl. 100 room motel, $1,057,370; expansion of facilities at Cumberland Falls State Park, near Corbin, Knox and Whitley Counties, $856,750; Kentucky Lake State Park near Benton, Marshall Co., $331,500.

▲ **Michigan**—PIPE LINE—Consumers Power Co., Dan E. Karn, pres., Jackson, 40 mi. pipe line to Kalamazoo from gas field in Allegan Co. $3,500,000.

▲ **Mich., Southfield**—RADIO AND TELEVISION STATION—American Broadcasting Co., WXYZ, Inc., 1700 Mutual Bldg., Detroit, radio and television station, $4,000,000.

▲ **Tex., Anahuac**—LIGHT AND POWER—City, City Hall, defeated bonds Nov. 23, 4000 kw. electric light and power plant, electric lines, $1,450,000. CD 7/30.

▲ **Ont., Toronto**—COLISEUM—Canadian National Exhibition Assn., Coliseum, Canadian National Exhibition Grounds, Toronto, plans by John B. Parkin Assocs., 1500 Don Mills Rd., Postal Station "J", Toronto, Zone 6, and Earl C. Morgan, 709 Church St., Toronto, Ont., assoc. archts., coliseum expansion. $1,000,000.

(Proposal Advertisement see pp. 77 and 78)

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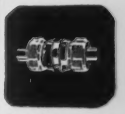
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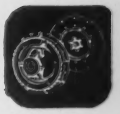
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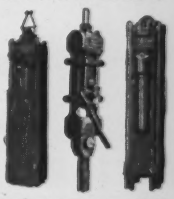

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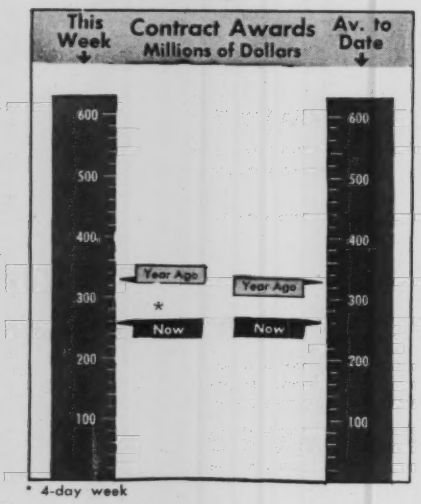
Construction Scoreboard

Activity this Week



* 4-day week

AMOUNT OF CONTRACTS LET

By Ownership	This Week*	Cum. 1958	1 wk Chge '57-'58
	millions		%
Federal	$14.7	$14.7	−64
State and Municipal	123.7	123.7	−11
Total Public	138.4	138.4	−23
Total Private	120.8	120.8	−17
U. S. Total	$259.2*	$259.2	−20
By Type of Work			
Waterworks	$2.3	$2.3	+108
Sewerage	20.0	20.0	+203
Bridges	3.1	3.1	−67
Highways	59.2	59.2	−14
Earthwork, Waterways	1.3	1.3	−91
Buildings:			
Public, Excl. Housg.	38.9	38.9	+4
Public Housing	9.1	9.1	+1038
Private Housing	36.3	36.3	−51
Commercial	6.4	6.4	−32
Industrial	67.6	67.6	+22
Unclassified	15.0	15.0	−67
U. S. Total	$259.2*	$259.2	−20

* 4-day week.

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

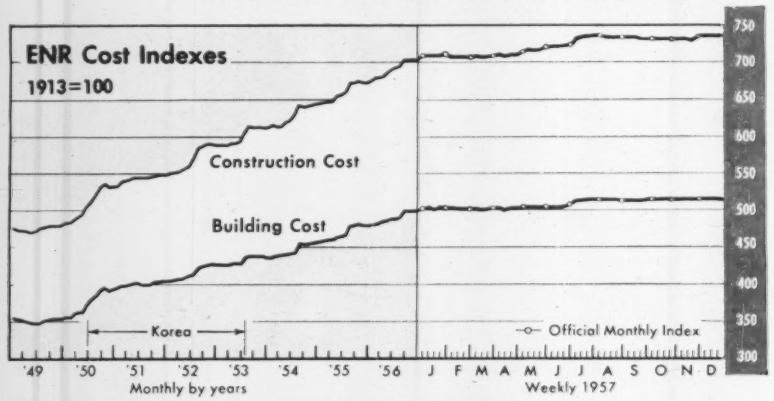
NEW CAPITAL FOR CONSTRUCTION

	Week of Dec. 26	Cum. 52 wks 1957	Chge '56-'57
	millions		%
Corporate Securities	$6.8	$5,683.1	+20
State and Municipal:			
All Except Housing	106.0	5,618.0	+20
Housing	1.1	184.9	+103
Federal Loans	6.6	200.2	+26
Federal Aid	...	2,161.2	+102
Total Nonfederal	$120.5	$13,847.3	+29
Federal Appropriations:			
In U. S.	...	$2,777.0	−20
Outside U. S.	...	29.0	+82
Total New Capital	$120.5	$16,653.3	+17

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	Week of Dec. 26 1957	% Change from Nov. 28 1957	% Change from Dec. 27 1956
Construction Cost	738.40	+0.04	+4.7
Building Cost	515.66	−0.1	+3.2

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518



WEEKLY ENR COST INDEXES, 1913 = 100 REVISED (r)

1957 Week	Construction Cost	Building Cost	1957 Week	Construction Cost	Building Cost
Nov. 7	737.21	516.59	Dec. 5	738.05r	516.25r
14	736.88r	516.60r	12	737.54r	515.80r
21	736.48	516.20r	19	737.54	515.80r
28	738.08r	516.28r	26	738.40	515.66

ENR INDEX REVIEW—REVISED (r)

	Construction Cost		Building Cost		Volume	
1957	1913 = 100	1949 = 100	1913 = 100	1949 = 100	1913 = 100	1949 = 100
Jan.	707.90	148.40	501.96	142.69	504	146
Feb.	710.06	148.85	502.59	142.87	546	158
Mar.	708.64	148.56	501.37	142.52	553	160
Apr.	709.39	148.69	501.37	142.52	564	163
May	715.70	150.04	503.01	142.99	553	160
June	721.36	151.22	504.17	143.32	588	170
July	724.15	151.81	506.62	144.01	587	170
Aug.	738.63	154.84	516.90	146.93	528	153
Sept.	737.78	154.66	516.12	146.71	466	135
Oct.	737.14	154.53	516.78	146.90	506	146
Nov.	737.43	154.59	516.81	146.91	457	132
Dec.	738.08r	154.73r	516.28r	146.76r	357	103
1957 Average	723.85r	151.74	508.67r	144.59r	517	150

ENR COST INDEXES IN 22 CITIES, 1913 = 100—REVISED (r)

City	Construction Cost Dec. 1957	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Dec. 1957	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	548	0	+5.1	456	0	+3.4
Baltimore	670	0	+11.3	520	0	+4.4
Birmingham	593	+5.3	+7.1	476r	+1.5	+4.6
Boston	765	−0.7	+2.4	523	−1.0	+2.6
Chicago	836	−0.1	+5.8	528	−0.1	+4.4
Cincinnati	748	0	+4.6	504	0	+2.6
Cleveland	859	−0.3	+4.8	524	−0.4	+3.2
Dallas	547	0	+2.3	451	0	+0.5
Denver	710	0	+2.0	522	0	+0.5
Detroit	831	0	+2.8	545	0	+3.4
Kansas City	742	0	+3.9	516	0	+2.6
Los Angeles	778	0	+6.4	513	0	+3.9
Minneapolis	788	0	+4.1	537	0	+2.2
New Orleans	591	0	+4.7	481	+0.2	+3.6
New York	888	0	+5.4	591	0	+3.9
Philadelphia	775	0	+3.7	561	0	+2.3
Pittsburgh	788	0	+8.4	568	0	+6.6
St. Louis	796	0	+5.0	546	0	+3.9
San Francisco	761	−0.3	+5.5	506	−0.4	+4.7
Seattle	747	−1.2	+3.5	458	−1.9	+2.0
U. S.—20 Cities' average	**738**	**+0.1**	**+4.9**	**516r**	**−0.1**	**+3.2**
Montreal	591	0	+5.3	453	0	+3.4
Toronto	609	0	+2.3	471	0	+2.5

How Valuable Is Recognition?

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Structural Steel Fabricators Cut Prices

Sharp decline in orders, severe competition force most steel fabricators to shave prices 2% to 30%

Prices of structural steel members have sagged nationally as a result of a sharp drop in orders, an ENR check of 18 cities in five regions shows. In every area the story was predominantly the same—a few months ago fabricators were desperately short of steel and order backlogs were sky-high. Deliveries from the mills were far behind schedule and the fabricators accordingly stretched out their own delivery dates.

Today steel is plentiful and delivery time is short, but the flood of orders has dried to a trickle. What is happening now is "the old story of the law of supply and demand," a Southwest fabricator declared. Because of a drop in heavy construction, the companies are going after the customers with price slashes in order to get the business available.

This price-paring worries some fabricators. A Miami steel executive said, "I don't think there is a fabricator in this area who has made a dime in the last three months."

The immediate future also looks uncertain to most of them. Throughout the nation fabricators, like many U. S. businessmen today, are not sure where to look for improvement. Some point to the now-idling interstate highway program, others to government defense outlays. And, as for prices, the most frequent expectation was that they would remain low until present inventories were worked off—a matter of several months.

• **A few exceptions**—In any overall report, there is also a minority view. In each region some firms reported an unchanged volume of orders, higher prices and an optimistic outlook. A few such firms were frankly exceptions, as the Tulsa fabricator who has raised prices 8% and increased his new business. He added, however, that his firm does not always follow the general trend.

But the trend as to price and volume of orders is unmistakable—it is downward. Price cuts have ranged from 2% to 30%—with a mean of about 12%—where fabricators would estimate them for ENR reporters. Where increases have occurred, they ranged from 5% to 10% and in most of these cases they represented the fabricator's attempt to pass along the recent mill price increases to his customers.

• **Southern dilemma**—The sharpest cuts in prices and new business were recorded in parts of the South, particularly Miami. "The Miami area is different from any other section of the country," Eugene D. Bailey, Jr., vice-president of Jafra Steel Co., said. "Down here they go out and get the money before they start on a building—the Miami Beach hotels, for instance. Financing is tough, and when the job does get started, the owner wants to be open by December 15, in time for the tourist season."

Another man, president of a Miami fabricating firm, said, "Four or five months ago we were grabbing at any supply of steel we were offered. But the business hasn't come along to justify those orders." He has cut prices 30% and is not optimistic about the first quarter of the new year, saying, "An engineer asked the other day 'what happened to business,' and he works three months ahead of my schedule." Prices will stay at their present levels, he believes, until present inventories are worked off.

In Atlanta and New Orleans, too, there were widespread reports of a sharp drop in new business and a shaving of prices. Bidding there, as in other parts of the country, is reported as keen. As for the short-range future, more than one fabricator said, "Prices can't get any lower, so we expect them to hold their present level." A few look to heavier outlays of government money toward the middle of 1958 to pull them out of the economic doldrums.

• **East Coast area hit hard**—Farther up the East Coast, in the area bounded by Baltimore and Boston, fabricators reported prices off generally from 10% to 20% and competition severe. In Philadelphia, small and medium-size fabricators have been setting the price pattern through energetic competition. Smaller firms have worked themselves out of their backlogs and, an executive of a large fabricating company said, "The small firms are really out hustling for business. They are underbidding us." With larger backlogs, the bigger firms are not now as hard-pressed.

The outlook for 1958, another Philadelphia fabricator said, "depends almost entirely on how fast the interstate road program moves." A third commented, "We hope the construction industry picks up. It often does without any advance indication. Let's hope it booms again in 1958."

Baltimore, too, has felt a drop-off in the fabricating business, though less severely than elsewhere. Prices are down slightly, and optimism is mixed with uncertainty.

In the New York-New Jersey area Joseph J. Storch, vice-president of Shacht Steel Construction Co., said his bookings in the past few months have shown a "terrific drop" from a year ago. Others in the area reported business "way down" or "down quite a bit."

Prices reflect the drop in orders. William Oltmer, treasurer of Oltmer Iron Works, Jersey City, N. J., declared that some competitors are "giving away" fabricated structural steel work at cost or even below. "Right now, prices are very low," he said. Similarly, Mr. Storch suggested that some of the bids currently being quoted can't cover overhead, but that fabricators are taking the jobs just to stay in business. It may be only a question of time, he said, before firms bidding below cost will have to cut back on such orders or fold up.

Four fabricators in the Boston area reported declines in business, although two of them have raised prices slightly. Their view of the next three months: Prices firm, or down a little; volume of business about the same.

• **Midwest hit**—Price declines are widespread among the Midwest fabricating firms reporting. In Cleveland, four have reduced prices, three of them by 10% to 15%. Four Chicago firms have shaded prices by small amounts, and three of four reporting St. Louis fabricators are quoting lower prices. By far the most frequent prediction by Midwest firms is that prices will hold their present level.

Moving west, three Denver fabricators have shaved prices by 10%.

The fabricating business in Seattle is being aided by dam construction, though prices have dropped as much as 20% below last year's level.

In San Francisco the price trend is mixed, though two out of three firms reported business declines. Los Angeles fabricators have felt the effects of the fall-off in construction, and one reports price cuts of about 8%.

Housing's Big "If"

Builders bank on action of government to hold '58 starts at 1 million rate

In the winter, a homebuilder's fancy turns to thoughts of spring. What will it bring in terms of housing? Last spring private housing starts, on a seasonally adjusted basis, were below 1 million. And it is now conceded that 1957's full year will end on that note—below 1 million.

Currently, builders are hoping that 1958's housing market at least will equal that of 1957, perhaps exceed it by a few thousand. But still their expectation of close to a million starts in 1958 is qualified by a big "if."

At a recent meeting of homebuilders and federal housing officials in Washington, a leading industry spokesman said starts this year will match last year's—if the government takes steps to liberalize housing credit and also bolster a wavering public confidence in the business outlook.

• **Action anticipated**—Richard G. Hughes, chairman of the Board of Trustees of the National Association of Home Builders, said that if the government acts to stimulate residential construction—and he added that most builders anticipate such action—the two year housing slump will have reached bottom in 1957.

Without such action and a restoration of buyer confidence, Mr. Hughes said, most NAHB members feel that housing starts in 1958 will drop 10% below 1957's level. Government officials currently expect that about 975,000 privately financed houses were started last year. New figures will be announced shortly. It will thus go on record as being the first year since 1949 that private residential construction fell below the 1 million mark.

There are figures that could serve, however, to offset some of the less cheerful views of 1958.

• **Rising trends noted**—Although last year's starts will fall short of the magic million, private starts for the next seven months stuck close to the figure on an annual basis and in November actually topped it by 10,000, falling short of the 1956 rate by less than 2%.

Another bright spot shows up in the conventionally financed starts category. Unhindered by interest rate ceilings on mortgages, these starts held above those of 1956 for nine out of 10 months last year. This group shows starts of 594,600, which represents an 8% increase over the same 10 months of 1956.

In addition, private starts with FHA mortgage financing have showed a cheering upward trend and in September and October barged ahead of 1956 by margins of 9% and 21%, respectively.

This was in contrast to the record of the first three quarters which lagged behind 1956 by 34% in the first quarter, by 27% in the second quarter, but only 3% in the third quarter. This category also comprised 21.5% of all private housing starts in October compared with 14% and 15% in the first two quarters of 1957 and 17% in 1956.

The weak sister of the housing family, of course, was the group financed with VA backing. Starts in this group were off 51% from 1956 in 1957's first 10 months. The low, fixed interest rate of 4½% is the low factor.

Public Works Boost

Administration releases $177 million in housing funds to boost economy

The Administration has turned around—in a small way—on public works. Some $177 million in housing funds, held up earlier as part of its economy budget-balancing drive, have been released to provide an immediate shot in the arm for some segments of homebuilding.

Admittedly, the impact is small, but the experts are taking the turn-around as a sign that the Administration is acting to counter the business slide that it now admits is under way.

Here's how the money breaks down:

• $98 million released by the Federal Housing Administration for housing for military personnel at military bases.

• $9 million has been released for purchase of mortgages for civilian housing at Patrick Air Force Base in Florida and the Army's Huntsville, Ala., Missile Center.

• $50 million for capital grants for urban renewal.

• $20 million for Fannie Mae to purchase co-op housing mortgages.

The Capehart housing money will be spent quickly; it's estimated that construction of the 6,226 units to be built at 11 bases will be under way within 15-to-30 days.

Here are the details, including number of units and dollar amounts:

Webb Air Force Base, Tex., 460, $6.4 million; Ft. Bliss, Tex., 490, $7.1 million; Ft. Ord, Calif., 900, $11.5 million; Yuma Army Test Station, 209, $3.3 million; Homestead Air Force Base, Fla., 1,255, $19 million; Ft. Monmouth, N. J., 120, $1.9 million; Ft. Leonard Wood, Mo., 1,269, $21.6 million; Beaufort Marine Air Station, 1,100, $16.5 million; Ft. Detrick, Md., 63, $1 million; Olmstead Air Force Base, Penna., 140, $2.2 million; and Kingsley Air Force Base, Ore., 220, $3.4 million.

The $9 million in additional mortgage money for civilian housing at Patrick and Huntsville covers some 500 houses already built, but not all sold at Huntsville; and construction of about half the 2,000 units scheduled for Patrick. About $10 million of these funds, provided by Section 809 of the housing law last year, has previously been released.

State to Ask Referendum On $100 Million in Bonds

The Kentucky Department of Education will ask the 1958 state legislature for a state-wide referendum on a $100 million or more bond issue for school construction.

Construction funds obtained by the bond sales would be distributed to local school districts on the basis of need and financial capabilities.

Dr. Robert Martin, State Superintendent of Public Instruction, said he will recommend that the bonds be a general obligation of the State Treasury. They would be retired with general tax revenues.

He did not say whether present income would be sufficient to retire the bonds or whether it would be necessary to levy new taxes to obtain the money needed for their repayment. "That is something to be worked out," Dr. Martin added.

He also said that the $100 million figure is not to be taken as the department's firm estimate, because actually that amount is not enough "to do the job."

West Coast Developer Plans Florida Project

A West Coast developer, Aldon Construction Co., will expand its operations to Florida in 1958. Willard Woodrow, president, said that North Miami has been chosen for the firm's first East Coast development, a three year, $90 million homebuilding project.

The first 1,000 of the 5,000 home project will get under way early in 1958.

(B&F continued on page 74)

Construction Markets

Hawaii: An On-the-Spot Report

One of the "boomingest" constructions markets the U.S. can claim lies 2,400 miles out in the Pacific. It is Hawaii, where contractors and developers are scrambling off in all directions to satisfy the voracious demands of the area.

Actually, most of the boom has been confined to Oahu, where Waikiki Beach, Honolulu and Pearl Harbor are located. The six other principal islands, though much bigger in total area, are relatively static. Some even have lost population to Oahu in recent years as a result of mechanization in farming, which reduced manpower needs. But population growth and prosperity on Oahu have forced territorial and county governments to program tens of millions of dollars for new arterial highways, schools, slum clearance and irrigation projects. The tourist industry alone will require a new airport and piers.

Tourism is one of the area's fastest-growing industries. In 1957 it brought in $78 million in business, a jump of 545% from 1947. By 1965 it may have overtaken even the sugar industry in economic importance. Now, the less active islands look to the tourist industry as a means of expanding and diversifying their economies, today dominated by sugar and pineapple growing.

Long-range resort developments—some to be built on coral reefs—are planned by practically all of the islands. Entire tourist centers are being mapped by Oahu land developers to supplement Waikiki, Hawaii's grass-skirt paradise. Jet travel, which will cut flying time between the West Coast and the islands to 4½ hours, is expected to add to the swelling tourist population.

Currently, Oahu is hard put to cope with an acute shelter shortage. Expected to help this problem are a $6.3 million hotel for Clint Muchison, Jr., a $10 million Capehart project for the Navy and several cooperative apartment and multi-unit housing developments totaling many millions of dollars. Hawaii's large military population has been an important factor in the housing shortage. The recent consolidation of Pacific and Far East military commands in Hawaii spurred plans for Capehart housing projects, ultimately to cost $100 million.

Industrial construction looks promising, too. Standard Oil Co. of California will start work on a $40 million refinery next year, and now Wilshire Oil Co. is considering a facility. Plans for a steel fabricating plant have been discussed, and several aluminum companies have geologists on the islands determining the extent of bauxite resources.

The big mid-Honolulu urban renewal and arterial highway projects will get under way this year if relocation housing can be found for about 15,000 persons. Relocation also has been the brake on expansion of the Honolulu International Airport and construction of a new terminal.

Electrical and telephone utilities also plan additions totaling several million dollars. But the economic sky is not without its clouds:

- A nationwide recession in the U.S. certainly would cut into tourist travel, and military and other spending commitments may change in the light of new defense requirements.
- Land costs in the territory are high.

The construction labor market, already working near capacity, is another rein on economic growth.

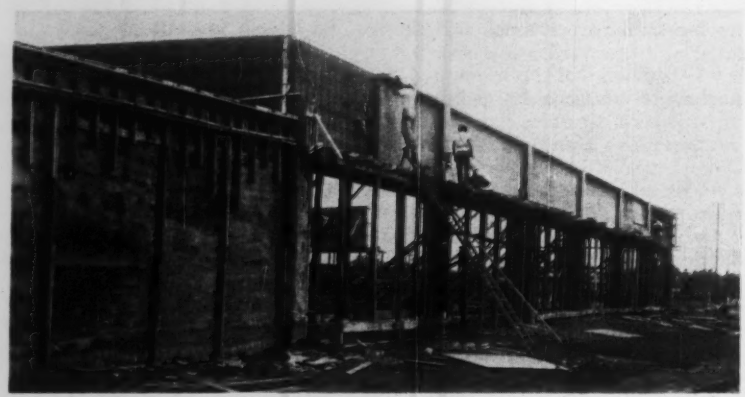
Choice residential land brings $2 and more a square foot, and the price is soaring. Henry J. Kaiser and Fritz Burns, California homebuilder, recently agreed to pay some $20 a square foot over the next 55 years just to lease a site for an addition to their expanding Hawaiian Village tourist center. The leasing of land is more popular in Hawaii than in the U.S. A few big estates own a major part of the private land and prefer long-term leasing to selling. Some estates now require initial payments as large as $10,000 as well as an annual rental for choice residential areas.

Financing money is tight—and expensive. Savings and loan associations report that interest rates range between 6½ and 7%, with a 1½-2% closing charge. Maximum amortization is 20 years, loans seldom top 65% of appraised value, and lending institutions are highly selective.

For large projects, little loan money has been available in the island. Local banks are almost fully committed, and many borrowers have turned to mainland insurance companies for capital. A $20 million shopping center is one of the latest to obtain its money from a U.S. source.

Financing difficulties held up a $21 million Capehart housing project at Oahu's Schofield Barracks for nearly a year. And labor troubles have plagued the job since it began.

A recent survey predicted that 1958 would see the beginning of construction worth $500 million on Hawaii. A more conservative estimate by the General Contractors Association puts the expected volume at $150 million, up from $135 million during 1957.



MILITARY FACILITIES provide a large amount of work. This is a new commissary for Schofield Barracks, where a $21.5 million Capehart housing job is under way.

New Year Brings New Pay Boosts

Collective bargaining for '58 starts with little change apparent in wage demands of construction workers

Collective bargaining with the building trades for 1958 already has begun with little indication of any softening of wage demands.

Among the groups that have gotten off to an early start are iron workers in Houston, Tex., laborers in southwestern Washington, plumbers in Alameda County, Calif., and carpenters, iron workers and laborers in central Arkansas. Demands or new contract commitments range from package increases of 50 cents to 81 cents an hour.

This year, members of the AFL-CIO building trades are—and will be—negotiating in an atmosphere newly charged with cost consciousness.

Early in December, a voluntary moratorium on 1958 wage increases was proposed by building trades' President Richard Gray as one of the means of combating inflation and stimulating construction employment. The idea, which has evoked a lot of contractor interest but little union support, will be presented to the general presidents of the building trades unions for policy consideration the end of this month.

• **Texas**—First returns on bargaining plans and sessions indicate that Mr. Gray's proposal is not cutting much of a swath in union circles.

Iron workers District Council in Houston, for example, has filed notice of intent to ask for a 20% pay boost.

Present contract with the union's Local 84 expires March 31. The notice marks the first round in area construction wage demands. Pattern established by the iron workers is expected to set the pace for the rest of the unions. About 25,000 construction workers in the area will be seeking new contracts within the next four months.

The iron workers said they will ask for a wage increase of 65 cents an hour plus "other benefits and changes." Present scale for top journeymen is $3.275 an hour—or $26.20 for an eight-hour day. About 2,000 iron workers in all classifications will be affected.

• **Washington**—The situation looks somewhat the same in the state of Washington, where the Western Washington District Council of Laborers has won a 50-cent package wage increase under a three-year contract with the Associated General Contractors.

The pay boost will be payable in three installments—20 cents as of January 1 and 15 cents on January 1 of the two succeeding years.

In addition, the 1,500 laborers covered by the contract will receive protection against cost-of-living increases. They will get an additional 5 cents an hour for each 2½ point change, computed as of June 15, 1958 and 1959, in the Bureau of Labor Statistics' Consumer Price Index.

With the first installment, skilled workers are getting $2.90 an hour. Scales for semi-skilled workers range from $2.60 to $2.90. Rate for common laborers is $2.60.

The contract, which also contains new shift payments for compressed air workers, became effective yesterday.

• **California**—Effective on the same date was a new three-year contract that grants Alameda County plumbers 81 cents an hour more over the life of the contract.

Pay boost installments called for by the contract are 28½ cents in base pay and 2½ cents in health and welfare, both effective January 1; and 25 cents, in base pay or fringe benefits at the union's option, each January 1 of the next two years.

Under the new contract, members of plumbers' Local 144 in Alameda County receive a total of 38½ cents an hour in fringe benefits. These include contributions for pensions, vacations, health and welfare and apprentice training and joint industry board funds.

New journeymen scale is $3.87½ an hour.

• **Arkansas**—The last few weeks in 1957 found the carpenters, iron workers and laborers in central Arkansas asking for a 50-cent wage increase, which is to be paid in three installments over a one-year period.

Negotiations were for a new contract to replace the one that expired December 31. The employer, Associated General Contractors, has been negotiating individually with the three unions, which embrace 3,000 workers.

Journeymen carpenters and iron workers in the area had a minimum pay scale of $3.00 under the old contract. For laborers, it was $1.35.

Legislative Proposals Called "Punitive"

Like the AFL-CIO, District Fifty of the United Mine Workers of America has found little to approve of in the Administration's forthcoming proposals for changes in federal labor law.

It views the proposals as "punitive" both in purpose and in nature and accuses their sponsors of advancing the program under the "pretext" of curbing union abuses.

District Fifty embraces the United Construction Workers.

Principal criticism of the union is that the legislative proposals contribute "little or nothing" to correcting union abuses while serving as a vehicle for the translation of anti-union sentiment into legislation.

The proposals were unveiled by Labor Secretary James Mitchell last month. They cover a wide range of union activities from the handling of union funds to boycotts (ENR Dec. 12, 1957, p. 146).

Most of the union abuses at which the proposals are ostensibly aimed, says District Fifty, can be eliminated through the enforcement of present legislation. Even if welfare fund disclosure is made mandatory, it asserts, misuse of welfare funds "would still be a matter for the Department of Justice and the courts."

It contends that the annual filing of union financial reports and other data would impose an "intolerable" burden on unions and be a "flagrant interference with the right of free assembly."

It strongly disapproves of a secret ballot for election of union officers and condemns the Administration's failure to seek repeal of the Taft-Hartley Act provision that permits states to pass right-to-work laws.

The entire program is viewed by District Fifty as conceived in a "petty spirit" of malice.

Labor Mergers Completed In Washington and Oregon

Oregon and Washington last month became the first two states to complete AFL-CIO mergers at the state and local levels.

The record was achieved with the merger of the CIO and AFL councils in Portland, Ore., and Yakima, Wash.

Despite a deadline of December 5 for mergers at state and local levels,

only 33 states have completed the process. Unmerged groups have been directed to "immediately undertake steps to merge." The AFL-CIO may revoke the charters of AFL and CIO groups that refuse or fail to merge.

AFL-CIO President George Meany, however, has indicated that compulsion will not be used to effect mergers. Members of the federation's Executive Council, working in teams of two, will attempt to bring about solutions to local problems that have held up mergers.

One of the problems is a dispute over jurisdiction between building trades and industrial unions. Mr. Meany has urged that that problem be divorced from the merger problem. Failure to merge at the state level, he has said, will not solve the jurisdictional dispute.

Emphasis now is being placed on union solidarity at local levels to offset attacks on organized labor including those expected in the legislature halls.

Not in "Commerce"

Court rules engineering firm is not subject to Fair Labor Standards Act

A federal court has ruled that a Virginia engineering firm with a branch office in Washington, D. C., is not engaged in interstate commerce or in the production of goods for commerce and is not subject to the overtime requirements of the Fair Labor Standards Act with respect to its nonprofessional employees.

The ruling rests on the theory that the activity of the firm is essentially local in character and that the plans and specifications it prepares are not "goods" in the ordinary sense.

In seeking an order to make the firm comply with the law, the Labor Department advanced three contentions: The firm is engaged in commerce across state lines; it produces plans and specifications that are "goods for commerce"; and its work is so closely connected with instrumentalities of commerce, such as airports and roads, as to be part of it.

The court rejected each of the arguments. Its crucial ruling was that the firm is "not employed to manufacture documents to be sold or transported in interstate commerce, but to give professional advice and assistance which of necessity was given permanent form as plans or specifications so as to be available for guidance and reference."

Firm involved was Lubin, McGaughy & Associates, Norfolk. The decision was handed down by the Circuit Court of Appeals for the Fourth Circuit.

Production of the plans, the court said, was localized, and travel and communications between the offices or between the firm and out-of-state clients did not make it interstate in character.

The court's ruling does not apply to employees who were actively engaged at out-of-state construction sites and who may be covered by the law, the court said.

Local Labor Units Told To Expel the Teamsters

The AFL-CIO has directed its state and local central bodies to sever their membership with the teamsters union.

In a letter dated December 20, the officers of all state and local central bodies were "directed to expel" local unions of the International Brotherhood of Teamsters "from membership in your bodies immediately."

The letter was signed by President George Meany and Secretary-Treasurer William Schnitzler.

Basis of the directive is the December 6 expulsion of the teamsters union from the AFL-CIO on the grounds of corruption. The order cites for its authority the AFL-CIO constitution.

Similar directives were issued with respect to two other unions that were expelled—bakery and laundry workers.

In each of these cases, however, special provisions were made for salvaging members of the expelled unions through the chartering of a rival union or direct affiliation of local unions with the AFL-CIO.

NLRB Cautious on Jurisdiction

Enters a dispute between carpenters and laborers over scaffolding but refuses to make an affirmative ruling

The National Labor Relations Board has banned attempts by members of the carpenters union in East St. Louis, Ill., to force assignment of scaffolding work for masonry purposes to them instead of to members of a laborers and hod carriers local union.

The decision reaffirms the NLRB's policy of entering jurisdictional disputes only if the disputing parties are not subject to the National Joint Board for the Settlement of Jurisdictional Disputes. It also reflects an NLRB policy of settling disputes it does entertain in a negative fashion—merely precluding the right to assert a claim without disposing of the merits of the claim.

Case stemmed from the picketing of two jobs on which the building and dismantling of scaffolding for masonry work had been assigned to hod carriers. Subcontractor who made the assignment was a member of the Mason Contractors Association of East St. Louis and the assignment conformed to that called for in the standard contract of association members with the hod carriers union. Picketing was done by members of a carpenters local, which is affiliated with a district council having a trade rule calling for performance of scaffolding work by carpenters. Carpenters also claimed the work belonged to them under a 1920 jurisdictional decision.

The NLRB held that the contractor could make whatever assignments of work he wanted to free of strike pressure from the carpenters because the carpenters had no certification or contract rights to the work. As an indication of its negative approach to the problem, the NLRB cautioned that it is not to be "regarded as 'assigning' the work in question to the hod carriers."

About nine months before the picketing began, the contractor and the association had notified the Joint Board that the carpenters were asserting a claim to the work and asked for "appropriate action to relieve us of this situation." The complaint was not formally processed. The NLRB considered this action "insufficient" to establish the fact that the dispute was submitted to the Joint Board so as to bind the parties and preclude the NLRB from entertaining the dispute.

During the hearing, the Carpenters District Council tried unsuccessfully to disclaim any responsibility for picketing. But the trade rule on scaffolding, the NLRB reasoned, acted as a mandate to council affiliates "to strike whenever scaffolding is assigned to employees other than carpenters." Through this device, the NLRB was able to extend the effectiveness of its restrictive order beyond the two projects and to make it embrace the jurisdictional area of the council.

The ruling, however, does little to clarify the law on the role of the NLRB in a jurisdictional dispute. Big question still to be answered is how to settle disputes on their merits when the voluntary process of settlement does not apply or fails.

While the law itself continues to sidestep the problem, the AFL-CIO building trades have taken a number of

forward looking steps to improve present settlement machinery. They have made the Joint Board procedure binding on all their affiliates and this action has been approved by the AFL-CIO. And they now require all local councils and their affiliated local unions to insert in their labor contracts a standard clause requiring the submission of disputes to the Joint Board. This is the only way presently available for getting a final determination of a dispute except by voluntary agreement.

Unions File Complaints On Wage Determinations

Wage determinations made under the Missouri prevailing wage law, enacted in the last session of the legislature, are under attack from several quarters.

Two of the building trades unions in St. Louis have charged that the wage scales set by the State Industrial Commission for five construction projects in three counties are below those prevailing in the area. Elsewhere, the City of Joplin is protesting the determinations for local sewer projects and is seeking a ruling on the law's constitutionality.

Unions that have appealed from the determinations are plumbers and steamfitters Local 318 and laborers Local 282.

The law requires the payment of prevailing wages, as determined by the State Industrial Commission, on public works projects undertaken by political subdivisions with public funds. Determinations are to be based on wages prevailing in the county where the project is located or in an adjoining one.

Labor Briefs . . .

• **No boycott**—The U. S. Circuit Court of Appeals in St. Louis has ruled that teamster picketing of a filling station construction job in conjunction with a strike against the oil company owning the station is not a secondary boycott. The decision reversed a ruling of the National Labor Relations Board.

• **New union**—Engineers and Scientists Guild, which says, "it is now clear to engineering employees that they cannot depend on management to take care of them," will be formally established as a union for engineering personnel at a New York City convention February 8 and 9.

• **Legal test**—The validity under a state right-to-work law of a master labor contract that calls for hiring of employees through a union is being tested in Nevada. The case, which affects a local union of the culinary workers, is before the District Court in Las Vegas.

OFFICIAL PROPOSALS

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SEND COPY TO: Official Proposal Division, Engineering News-Record, 330 West 42nd Street, New York 36, N. Y.

Bids: February 3, 1958

Invitation for Bids
City of Northampton, Massachusetts

The Board of Sewer Commissioners acting for and in behalf of the City of Northampton, Massachusetts, will receive sealed bids for the construction of the sewage treatment plant and the reconstruction of sewers in Hockanum Road and Williams Street, all located in the City of Northampton, Massachusetts, until February 3, 1958, 7:00 P.M., at the office of the Board of Sewer Commissioners, Northampton, Massachusetts, at which time and place all bids will be publicly opened and read aloud.

The successful bidder will be required to furnish a Performance Bond and a Labor and Materials Bond, as set forth in the Specifications. Attention is called to the fact that not less than the minimum wage rates as set forth in a schedule contained in the Specifications must be paid on this project. Attention is also called to the requirements relating to Workmen's Compensation and conditions of employment.

Contract Documents, including Drawings and Specifications, will be on file on and after January 6, 1958, at the office of the Board of Sewer Commissioners, Northampton, Massachusetts, or at the office of the Engineers, Morgenroth & Associates, Inc., 294 Washington Street, Boston, Massachusetts. Copies of the documents may be obtained by depositing $75.00 in cash or certified check, payable to the City of Northampton, for each set of documents so obtained. The amount of the deposit will be refunded to each who returns all documents in good condition within 5 days after opening of bids.

Sub-bids will be taken on the following portions of the work: 1. Painting. 2. Heating and Ventilating. 3. Plumbing. 4. Electrical Work. 5. Lathing and Plastering. Bids of the sub-bidders designated above shall be received by the Board of Sewer Commissioners no later than January 27, 1958, 10:00 A.M., at the office of the Board.

The Board of Sewer Commissioners reserves the right to reject any or all bids of the general bidders and to waive any informalities in bidding, if it be in the public interest so to do. The Board of Sewer Commissioners also reserves the right to reject all bids of the sub-bidders on any item or items and to waive any informalities in the bidding, if, such rejection or waiver be in conformance with Section 44c of Chapter 149 of the General Laws.

Cash, or certified check, or treasurer's check or cashier's check issued by a responsible bank or trust company, payable to the City of Northampton shall be submitted with each bid as follows:

1. By General Bidders in the amount of five percent (5%) of the amount of the General Bid, but not more than fifty thousand dollars ($50,000.00).
2. Sub-Bidders listed under Item 2 of the General Contractor's Bid Form five percent (5%) of the Sub-Bidders bid price, but not less than one hundred dollars ($100.00).

All bid deposits of general bidders, except those of the three lowest responsible and eligible bidders, and all bid deposits of sub-bidders except (a) those of the sub-bidders named in the general bids of the three lowest responsible and eligible general bidders and (b) those of the three lowest responsible and eligible sub-bidders for each sub-trade will be returned within five days, Saturdays, Sundays and holidays excluded, after the opening of the general bids. The remaining bid deposits will be returned upon the execution and delivery of the contract for the proposed work, or if no award is made then within thirty days, Saturdays, Sundays and holidays excluded, after approval by the Federal Government.

City of Northampton
By Board of Sewer Commissioners
Chairman

Bids: January 23, 1958

Soil Explorations and Foundation Investigations

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m. Eastern Standard Time, on January 23, 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 565, BROOME COUNTY LINE TO 6.22 MILES SOUTH OF INTERSECTION OF STATE ROUTES 11 AND 41 AT POLKVILLE, PROJECT I-1127(1), ITEM 56, CORTLAND COUNTY, WHICH CONSTITUTES CONTRACT NO. SPEC. FA-SM-113.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.
(b) Mr. Earl E. Towlson, District Engineer, New York State Department of Public Works, 333 East Washington Street, Syracuse, New York.
(c) Mr. William M. Trainer, Associate Contract Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50 percent of deposit.

The Engineer's Estimate of cost for this work is $35,975.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $2,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPERINTENDENT OF PUBLIC WORKS

Bids: January 14, 1958

Contract NYA-402.225

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
HANGAR NO. 17
BORINGS

Sealed proposals for taking samples and making borings at the site and in the vicinity of new Hangar No. 17 at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, January 14, 1958, at which time said proposals will be opened and read in Room 1108.

Contract Documents may be seen at the office of the Engineer of Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 2, 1958

OFFICIAL PROPOSALS

Bids: January 21, 1958

Contract NYA-780.003

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
TWA HANGAR NO. 12
LANDSCAPING

Sealed proposals for landscaping at Hangar No. 12 (TWA) at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, January 21, 1958, at which time said proposals will be opened and read in Room 1108.

Contract Documents may be seen at the office of the Engineer of Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good conditions not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 2, 1958

U. S. Government

Department of Commerce, Bureau of Public Roads, December 20, 1957. SEALED BIDS will be received at the office of the Regional Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., E.S.T., January 23, 1958, for Project 1H3, Blue Ridge Parkway, Amherst and Bedford Counties, Virginia. Bridge over James River. Structural Steel or Prestressed Concrete Superstructure of 1,040 foot length on Concrete Substructure. Project length: 0.753 mile. Aside from the Superstructure, the approximate quantities of the more important items are: 65,550 cu. yd. Excavation and Borrow in Roadwork, 4,550 cu. yd. Excavation for Bridge, 3,070 cu. yd. Concrete and 226,500 lb. Reinforcement Steel. Minimum wage rates have been fixed as required by law. Plans, specifications and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Regional Engineer.

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OFFICIAL PROPOSALS

Bids: January 21, 1958.

Contract HT-190.002

THE PORT OF NEW YORK AUTHORITY
HOLLAND TUNNEL
NEW YORK EXIT IMPROVEMENT
EXIT REALIGNMENT & PEDESTRIAN BRIDGE

Sealed proposals for the construction of a pedestrian bridge (not including structural steel therefor), alterations to pavements, sidewalks and lighting and other miscellaneous work for the improvement of the New York Exit from the Holland Tunnel will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, January 21, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 2, 1958.

Bids: January 21, 1958.

Contract PN-490.001

THE PORT OF NEW YORK AUTHORITY
PORT NEWARK
LAND RECLAMATION
EXCAVATION OF UNSUITABLE MATERIAL

Sealed proposals for the excavation and disposal of unsuitable material for the reclamation of land at Port Newark will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, January 21, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 2, 1958.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5004) will be received at Lindsay, California, until February 4, 1958 for furnishing labor and materials for Laterals 119.6 and 122.5 and Sublaterals, Unit I Extensions, Southern San Joaquin Municipal Utility District, Friant-Kern Canal Distribution System, Central Valley Project, California. Location near Delano, California. Principal items are 80,020 cu. yds. excavation; 66,900 lin. ft. concrete pipe lines, 12- to 45-inch; 132 cu. yds. concrete; furnishing and installing 2 pumping units and other equipment and materials; and other work. Completion time 300 days. For particulars, address Bureau of Reclamation, P. O. Box 525, Lindsay, California; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: January 9, 1958.

Soil Explorations and Foundations Investigations

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m. Eastern Standard Time, on January 9th, 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 502, ESSEX-CLINTON COUNTY LINE TO SOUTH PLATTSBURGH, SECTION 7A-1 AND 7A-2, PROJECT 1-1119(1), ESSEX AND CLINTON COUNTIES, WHICH CONSTITUTES CONTRACT NO. SPEC. FA-SM-115.

Maps, plans and specifications may be examined and obtained at the following offices:

(b) (a) Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.

(b) Mr. Robert W. Sweet, District Engineer, New York State Department of Public Works, 444 Van Duzee Street, Watertown, New York.

(c) Mr. William M. Trainer, Associate Contract Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50 percent of deposit.

The Engineer's Estimate of cost for this work is $14,850.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders". The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPERINTENDENT OF PUBLIC WORKS

Bids: February 4, 1958

Contract NYA-420.002

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
COMMISSARY BUILDING NO. 183

Sealed proposals for the construction of a commissary building at New York International Airport together with paving and utilities therefor will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y. until 2:30 P.M. on Tuesday, February 4, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 2, 1958

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P-6870, Engineering News-Record
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POSITIONS VACANT

Additional Position Vacant Advertising on Following Page

Civil Engineer, major in soil mechanics and foundation engineering, to assist in writing reports and supervise laboratory work. Opportunity for advancement with young growing firm in southwest. Furnish full particulars regarding education and experience as well as salary required. P-6803, Engineering News-Record.

Mechanical Contractor Needs Man for design, promotion, construction, of Propane, jet fuel, natural gas systems. This is an excellent opening for a permanent position in Atlanta home office of established engineering-construction firm. Prefer engineer with at least seven years' experience, partly field, estimating, selling, under 35 years. Salary open with bonus, hospitalization, profit sharing plan and other benefits. Prefer man presently employed wanting better opportunity and able to assume a share of management in aggressive, rapidly growing company. Present employer will not be contacted without your approval. Expenses paid qualified applicant for local interview. P-6875, Engineering News-Record.

Civil Engineers—Resident engineers to supervise construction inspection of earth fill and concrete dams in central and western Pennsylvania. Must be graduate civil engineer and show satisfactory experience in inspection and administration of contract work. Salary open. Submit resume, salary requirements and three references. P-6897, Engineering News-Record.

Wanted: Civil Engineer experienced in water filter plant design and deep well water supply in coastal areas. Give complete educational and experience record and salary requirements. P-6900, Engineering News-Record.

Sales Engineer to work for steel fabricator located in Western Massachusetts-Albany area. Prefer man familiar with structural steel designing and take-off. Rapid advancement with good pay possible. Our employees know of this ad. P-6905, Engineering News-Record.

Hydraulic Engineers—Civil Engineer Graduates—All grades, interested or experienced in Stream Flow Measurements, analysis of Hydrologic data, Hydraulic design criteria for dams, channels and bridges for regulatory agency. Duties include review of plans and specifications, report writing, operation of stream-gaging network, interpretation of stream flow data, field investigations and inspections, with some travel and public relations. Salary depending on experience, Location Harrisburg, Pennsylvania. P-6828, Engineering News-Record.

Experienced Estimator—General Contractor, commercial, industrial, civic and school construction, $100,000 and over, New Hampshire Civil Engineer or equivalent. Send resume of education, experience and salary required to P-6722, Engineering News-Record.

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POSITIONS VACANT

Superintendent thoroughly qualified, large sewer & watermain installations. Permanent, N. Y. State. P-6844, Engineering News-Record.

Help Wanted—Male Experienced Graduate Engineer for structural steel take-off and estimating. Box 955, New Haven, Conn. Must hold, or be able to procure immediately, Conn. State License.

Superintendent, Electrical — Large Power-house Experience, preferably Hydro. Send resume of education, experience, salary expectations, photo if available, etc. to Electrical Constructors, P. O. Box 2178, Columbus 16, Ohio.

Superintendent, Transmission Line — Steel Tower Erection Experience. Send resume of education, experience, salary expectations, photo if available, etc. to Electrical Constructors, P. O. Box 2178, Columbus 16, Ohio.

Civil Engineer, 4 years college in Engineering plus 2 years experience including 1 year in Civil Engineering Design. Additional experience may be substituted for college. Write State Personnel Director, State Office Building, Hartford, Connecticut.

Structural Engineer, 4 years college in Engi-neering plus 6 years experience including 4 years supervision of structural design. Additional experience may be substituted for college. Write State Personnel Director, State Office Building, Hartford, Connecticut.

A major Canadian construction company re-quires engineers and supervisory personnel for a large tunnel earthworks and concrete dam in Venezuela, South America. The project will be for approximately three years. Good living accommodation and excellent salary arrangements. Replies should contain a full outline of personal data, experience and references. P-6939, Engineering News-Record.

EMPLOYMENT SERVICE

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POSITIONS WANTED

CE Concrete Pipe Desires Concrete Pipe, Ready Mixed or Prestressed Work. Production or Management. PW-6919, Engineering News-Record.

POSITIONS WANTED

Construction Executive, 42, twenty years ex-perience. All phases Industrial, Commercial, Institutional, Military, Shipyard, and Heavy Construction. Bids to completion. Graduate Civil and Structural Engineer. Certificate in Mechanical Engineering and Naval Architecture. General Construction Management; Contract Negotiation; Supervision; Public and Labor Relations; Cost analysis; Estimating and Quantity Survey. Desire permanent connection with possible future participation. Central New Jersey or Eastern Pennsylvania. Minimum $15,000.00 Available after January 1, 1958. Certain Key personnel available with me. PW-6689, Engineering News-Record.

Civil Engineer with Commercial Pilot and Instrument Rating desires position as Pilot-Engineer or Pilot-Sales Engineer. College grad., age 31, married, 8 years with Public Works Department in Eastern State. Last 2 years as Right of Way Engineer with remainder in highway design and resident engineer. Will relocate. PW-6766, Engineering News-Record.

Administrative Engineer, 39, engineering & construction of ind'l-process plants; ability and experience unique in Effective Cost Control, Preplanning, Scheduling & Better Methods, PW-6914, Engineering News-Record.

Project or Office Engineer, MCE, 34, 9 years experience in idustrial and heavy construcion, desires position in middle Atlantic states or Florida. PW-6909, Engineering News-Record.

Office & Cost Engr., 32, graduate Civil Engi-neer with 7 years of varied experience, including cost engineering estimating, liaison and field inspection would like to work for general contractor or consultant, foreign assignment preferred. Completing present foreign job and will be in the States by January 15. Resume on request. PW-6858, Engineering News-Record.

BSCE 38 Materials Engineer, Broad experi-ence in all phases of field control work. Knowledge of Spanish. Desire foreign assignment. References and resume upon request. PW-6940, Engineering News-Record.

(Continued on the following page)

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P-6881, Engineering News-Record
Class. Adv. Div.
P. O. Box 12, N. Y. 36, N. Y.

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P-6709, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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Excellent opportunity with consulting firm. Liberal benefit plans and good working conditions. Location Middle West.

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P-3223, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

EXPERIENCED HYDRAULICS ENGINEER WANTED

Graduate engineer experienced in paper mill hydraulics, planning and development of piping layout systems, etc. for large expanding and progressive mill in Maryland. Good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

POSITIONS WANTED
(Continued from preceding page)

Ground Water Geologist-Geophysicist. 37, married. B. S., M. S., geology credits for D.Sc; physics minor, calculus, physical chemistry, engineering subjects. Returned from Turkey, Iran, Libya, Spain, Greece in charge of U. S. military water supply programs. 5 years U.S. Geological Survey. Experienced in electrical resistivity, magnetometer, seismograph, air photography-mapping, piloting, supervision, reports. Desire water exploration, exploitation, improvement, or research, with industry, consultant, or public organization. PW-6925, Engineering News-Record.

Supt. for Gen. contracting firm with an annual volume or potential of 5 to 15 million dollars in buildings, state hospitals, extensive exp. in Capehart Housing. Age 37, single, willing to travel. I get results. Seeking permanent position with reliable Co. Available after Jan. 1958. PW-6915, Engineering News-Record.

Construction Supt. General Construction. PW-6827, Engineering News-Record.

POSITIONS WANTED

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Gen'l. Supt., bldg. estimator BSCE, 33. 12 years varied experience. Available for responsible position South Amer. or Foreign. PW-6876, Engineering News-Record.

Civil Engineer — Professional — Land Surveyor: Consultant; Construction, Per Diem or Contract: Anywhere; Resume on request. PW-6904, Engineering News-Record.

Civil & Structural Engineer, 35, European background German degree, 6 years U. S. experience in design of ind'l bldgs. U. S. citizen. Languages: English, German, Serbo-Croat, French. Desires position abroad, PW-6831, Engineering News-Record.

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Structural Engineer desires Fixed Bridge Design and preparation of plans. Proper Staff. Contract or Per Diem. Registered Prof. Engr. SS-6843, Engineering News-Record.

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W-6884, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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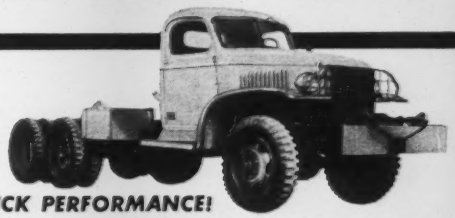

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The Year Ahead

THE CONSTRUCTION INDUSTRY in 1957 turned in a volume of contracts nearly identical with the award totals of 1955, which was the second biggest year on record. And the year just started promises to chalk up contract totals very close to those of 1957. Thus, another busy year for construction can be expected.

In attempting to assess the pattern and the tone of the year ahead, however, it is clear that the ebullience, which has continuously characterized crystal gazing since the war, must give way to a more sober mood. Basically, this is because our expanding economy has temporarily ceased to expand. Capacity has caught up with demand in many lines, with the result that capital spending by industry must wait until new pressures for products can accumulate.

The Russian threat in the missile field is also a definitely sobering influence, and to a great extent it is this development that will set the pattern for 1958. Thus there is little likelihood that any new federal water development projects will get big money. Some of those already under way could be slowed if federal funds are diverted to defense. At the same time, however, sizable military expenditures will go into construction as air base facilities are dispersed and missile launching bases are designed and put under contract.

There also will be an urgency to this work, probably unmatched since the war construction days. This same tone could also be aroused in the civil defense field if the details of the secret Gaither report on the need for air raid shelters are eventually made public. The report is believed to have urged a massive program of construction of this type.

Expanded foreign economic aid will be another development allied to military necessity, which will augment construction. With Russia stepping up her activities in this field, there is a definite threat that some of our friends and vital allies will be picked off unless we do far more in the underdeveloped countries than we have heretofore. Involved would be construction of every conceivable type, with water, housing and transport facilities predominating.

Another facet of the 1958 pattern will be the emergence of public work as the major influence in construction (see p. 23). In 1957, public works contract totals edged ahead of private work for the first time since 1949, except for the year that the huge atomic energy program gave public work a short-lived advantage. In 1958, the disparity between public and private work will continue to grow. Highway contracts will exceed 1957 totals. So will water and sewerage projects. Such public buildings as schools, office buildings and scientific research establishments should also increase.

In contrast, both industrial and commercial buildings will show further declines. The only certain increase in private work is in the electric utility field, although housing, under the influence of easier mortgage money may stage a comeback. In 1957 it dropped below a million private units for the first time in eight years.

Finally, the year ahead will be one of intense competition for the work that is available. It should also be one of increasing efficiency in construction, and perhaps of lower costs, since materials and equipment will be in ample supply and labor more willing to help in getting more productivity.

Keeping America strong is construction's job in 1958, plus keeping itself strong so as to be ready for the next expansion period, when the current recession has run its course. A busy and exciting year lies ahead.

Land Surveyors and Engineers

SHOULD LAND SURVEYING be considered "separate and distinct from engineering," or is it a branch of the engineering profession?

In an interim report made some months ago (ENR Mar. 21, 1957, p. 34) a task committee of the Surveying and Mapping Division of the American Society of Civil Engineers favored the former view—two distinct professions. In its latest interim report (ENR Nov. 7, 1957, p. 29) the committee appears to have reversed its earlier finding, now suggesting it is correct to assume land surveying to be a part of engineering.

The apparent change in the committee's thinking can be explained as an attempt to view the problem in as long-range perspective as possible. And this involves a desire to see land surveying ultimately elevated as a profession, as it is in other lands, rather than to be downgraded now as a result of a too narrow statement of ASCE policy.

If the question of where land surveyors stand today is viewed as needing an immediate answer, the choice the committee offered last spring is the more logical: Consider land surveying as an endeavor separate from engineering, keep its licensing separate, and permit its educational requirements to remain what they are.

The longer-range view espoused by the committee—to encourage land surveyors to become true professionals at some future time, with the body of knowledge, the educational requirements, and all other attributes of professionals—is not without its merits, but is patently idealistic. In effect, it is a "wait-and-see" policy, and as such it may be as good as any.

In any event, the committee offers ASCE a difficult choice: Decide land surveying is not engineering, perhaps relegate it forever to the non-professional station of a trained specialty; or decide to bring land surveying back into engineering and face a long, hard program of upgrading its requirements. A lot will depend on the attitude toward their own future of leading land surveyors themselves.

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And if a mishap *does* befall and get you into trouble
A stalwart, trusty Travelers man will see you on the double."

4.

"The worry's his—not yours—because The Travelers never stops
Till everything's just dandy and your worker's feeling tops."
Now Dick is in the chips again—he bought the Travelers plan.
And it can do the same for you. So call your Travelers man.

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Are other ways The Travelers helps a contractor like you.

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TIME and time again, machinery makers come to the Timken Company for help with some special bearing application problem. One they think hasn't been solved before. And time after time, from our 30 types and 10,247 sizes of Timken® tapered roller bearings, we've come up with the bearing design to do the job and at minimum cost.

It's no accident that we can help out so often. In over 50 years of helping machinery builders with bearing problems, we've engineered and produced the world's largest selection of tapered roller bearings. And we've constantly improved our designs. The answers to thousands of bearing application problems are already in our files. Ready and available to help you.

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